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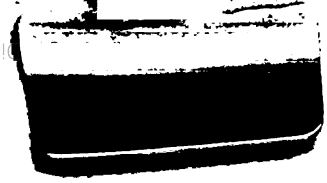

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PROCEEDINGS OF FOREST FIRE CONFERENCE

OF THE

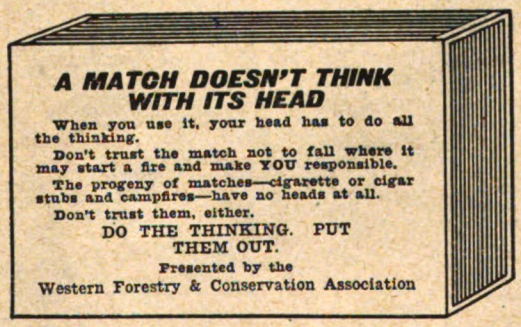
FOREST PROTECTIVE ORGANIZATIONS OF THE PACIFIC COAST

COMPOSING THE

WESTERN FORESTRY AND CONSERVATION ASSOCIATION

WITH STATE, FEDERAL AND BRITISH COLUMBIA FOREST AGENCIES

Seattle, Wash., December 2-3, 1912


A MATCH DOESN'T THINK WITH ITS HEAD
When you use it, your head has to do all the thinking.
Don't trust the match not to fall where it may start a fire and make YOU responsible.
The progeny of matches—cigarette or cigar stubs and campfires—have no heads at all.
Don't trust them, either.
DO THE THINKING. PUT THEM OUT.
Presented by the
Western Forestry & Conservation Association

PRINTED BY
THE TIMBERMAN, PORTLAND, ORE., U.S.A.
1912

FORESTRY DEPARTMENT

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Organizations Composing the Western Forestry and Conservation Association

(Article IV of Constitution: "Any association formed for the purpose of organized effort in the protection of forests from fire and for the reforestation and conservation of the forest resources of the states represented shall be eligible for membership. Any organization admitted to membership shall be entitled to two votes in the meetings of this Association. The chief forest officer of each of the five states embraced, and of each district of the United States Forest Service embraced, shall be honorary members.")

Northern Montana Forestry Association,

North Idaho Forestry Association,

Coeur d'Alene (Idaho) Timber Protective Association,

Pend d' Oreille (Idaho) Timber Protective Association,

Potlatch (Idaho) Timber Protective Association,

Clearwater (Idaho) Timber Protective Association,

Washington Forest Fire Association,

Oregon Forest Fire Association,

Klamath-Lake Counties (Oregon) Forest Fire Association,

Coos County (Oregon) Fire Patrol Association,

Jackson County (Oregon) Fire Patrol Association,

Linn County (Oregon) Fire Patrol Association,

Oregon Conservation Association,

Western Lane County (Oregon) Fire Patrol Association,

Columbia County (Oregon) Fire Patrol Association,

Clackamas-Marion Counties (Oregon) Fire Patrol Association,

Douglas County (Oregon) Fire Patrol Association,

California Forest Protective Association,

Redwood Fire & Protective Association,

and numerous co-operative patrols without formal organization.

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Proceedings and Addresses 1912 Forest Fire Conference Western Forestry and Conservation Association

Following the precedent inaugurated in 1912, when a similar meeting was held in Portland, the Western Forestry & Conservation Association combined with its regular December meeting this year a forest fire conference of all forest protective agencies in the five Pacific forest states, private and official, and took a further co-operative step in securing the hearty participation of British Columbia.

The conference was held in Seattle, December 2 and 3, this city being chosen mainly in compliment to the Canadian guests, to facilitate their attendance. Seattle lumbermen acted as hosts to all, providing facilities and entertainment. E. T. Allen, of Portland, forester for the association, arranged the business program, classifying the topics of chief interest in fire work and securing practical experts to present them.

About one-third the standing timber in the United States and most of that in British Columbia was represented by those responsible for its protection. Besides the private patrol associations of Montana, Idaho, Washington, Oregon, and California that comprise the Western Forestry & Conservation Association, there were present federal and state forest officials from these states and others as far east as Colorado, eastern representatives of the American Forestry Association, Canadian provincial and dominion officials, representatives of nearly all the great transcontinental railroads, and prominent lumbermen from both sides of the international boundary.

As is the custom of the association, no time was devoted to formalities or general platitudes concerning the desirability of forest protection. The conference was assumed to be a business meeting of the men responsible for expending large sums in protective work, with its object the discussion of technical methods to increase efficiency. Papers and discussions were held rigidly to practical constructive contribution of working details for actual practice.

Among the points most emphasized were the systematizing of field co-operation between private, state and federal patrol forces; decreasing political interference with the efficiency of state work; increased railroad interest in forest protection; advance in organization and equipment; usefulness of telephones in fire prevention; possibilities of wireless; legislative needs, and fire rules in logging camps.

President A. L. Flewelling, of Spokane, called the conference to order at ten o'clock Monday morning in the ballroom of the Washington Hotel. Green fir boughs concealing walls and pillars simulated a forest scene, while here and there were the brilliant red and blue pictorial fire warnings issued by the association. Each delegate was further given the spirit of the meeting by finding on his chair a box of matches bearing the following label:

> A MATCH DOESN'T THINK WITH ITS HEAD
>
> When you use it, your head has to do all the thinking.
>
> Don't trust the match not to fall where it may start a fire and make YOU responsible.
>
> The progeny of matches—cigarette or cigar stubs and campfires—have no heads at all.
>
> Don't trust them, either.
>
> DO THE THINKING. PUT THEM OUT.
>
> Presented by the
> Western Forestry & Conservation Association.

PRESIDENT FLEWELLING'S ADDRESS.

Gentlemen of the Convention: The subject of the protection of the forests from fire is the one nearest the heart of every lumberman and timber owner. Not from a sentimental standpoint alone, but from a viewpoint of good business. Lumbering is the dominant industry of the states comprised in this association, and will be for the next fifty years, and the only way to prolong the life of the industry and the benefits arising therefrom is to prevent the standing timber from being destroyed by the destructive fires which, unless prevented, naturally follow logging operations.

We have demonstrated in the past that fires are preventable and that with proper organization, small fires can be put out, and that nature provides the new growth without planting and matures it unaided if protected from fire, that we can't put out fires by talking, and that it takes money to hire fire-fighters and run an organization. We are no longer in the kindergarten, we are as thoroughly organized as a great army. We are not here to boast of our achievements, but to present you with an experience table which will demonstrate the facts, and which will carry conviction to the mind of every thinking man, that our work in forest protection is unsurpassed in the civilized world.

To reach this state of satisfactory organization has required a vast amount of hard and unselfish work on the part of the officers and members of the districts and state organizations of which this great association is composed, and the expenditure of vast sums of money for rangers, for new equipment and supplies, but it has been worth the cost in money and effort and the foundation stones on which we have built our structure will endure.

When we first begged the manager of a railway to equip a few locomotives with oil-burning devices, as an experiment to demonstrate the difference in cost of fuel, so we could show other railway managers that the difference in expense would be overcome by the amount saved in fire damage suits, we did not know that oil would prove to be the cheaper fuel, neither did the railway manager, but the experiment was tried and as a result, what was deemed by some as a crazy theory, has proved a blessing in that all locomotives on most railways in the forest districts are now burning oil fuel, and thus we have eliminated at least 30 per cent of the fire hazard which we formerly had to contend with. This branch of our campaign of education has been highly satisfactory to both the railroads and the timber men and we are now carrying it a little further by asking the logger to equip all donkeys and engines with oil burners. The campaign of education which this association has carried on in the past, through the press and through the public schools has borne fruit. We are now able to convince the rancher that he can clear his land at certain seasons without menace to the standing timber and we send trained rangers to supervise this burning. The rancher has been educated to a broader view largely through what his children have learned of our work through the public schools. The careless camper and fisherman now knows that the forests are now under a system of military discipline and that during the fire season (so-called) he is registered into the woods and is held accountable for the extinguishment of his camp fire. All this is public knowledge, therefore educational.

We have arrived largely through the application of common sense, to the situation. Prior to the formation of this association a condition had been brought about by the extreme and unpractical views of some radical timber owners on the one

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side, and the short-sighted, extreme and unwise views of the old-fashioned lumbermen had resulted in clouding the issue and had left both sides to the controversy fiddling while Rome was burning. Now each side has conceded a little, and it has been found they never were very far apart, a whole lot of theory has been eliminated, and common sense substituted in its place and all have been brought to the realization that each particular district has its own specific conditions and that no hard and fast rule could be made practical in all the territory covered by this great organization. So it has been conceded that each state organization should look after its own legislation and each district organization look after its own methods of prevention and fire-fighting, each giving to the other the experience table of the past, so that whenever a good thing or a new method developed in one district if like conditions permitted, it could be utilized and adopted in other districts. Thus while our organization has great strength, it is flexible enough to accommodate itself to local conditions in each state and district as they actually exist.

This organization gives the most practical demonstration of co-operation between the Federal Government, the state and the private owners of standing timber ever obtained. There is now such a unity of sentiment between all the parties at interest, that every subject or controversy can now be discussed and settled on broad lines, without any suspicion of bad faith on the part of any one, and all our contracts for joint patrol, telephone service and division of territory between the district organization and the Government and the states are being carried out without any friction.

You will be told during the progress of this meeting by the men actually engaged in the work, of the progress we have made during the past year in our methods of preventing and fighting fire in the several districts, all new experiments which have been tried or which remain to be tried to make our system more perfect and of all our hopes and aspirations for the future.

You will also be told by the district and state officers the cost per acre of patroling, the cost per mile of telephone lines and trails and all the statistical details of our work, and of the hundreds of thousands of dollars spent in protecting the great territory covered by this organization which contains the largest and finest body of standing timber in the civilized world. You will be told why it is easy to place a bond issue on timber which is under our protection and a thousand and one other things which should not be covered by the president's address.

I wish again, as president of this organization and on its behalf, to publicly express my appreciation of the value of the assistance we have received during the past year from the Government Forest Service, from state officials and from the press. Each one has done his share in contributing to our success by word and deed, and our wonderful success is in part due to the hearty co-operation and support we have received from these sources. Nor do I wish to forget the private timber owners who without complaining are always ready to furnish the money for the sinews of war, without which we would be utterly helpless in facing our great enemy, the forest fire.

In conducting this meeting let us approach and discuss all subjects in a spirit of fairness and friendliness, but in handling subjects for the common good, don't fail to put on your hard gloves. (Applause.)

REPORT OF SECRETARY-TREASURER.

George M. Cornwall, secretary-treasurer of the Association, submitted his regular annual report.

REPORT OF FORESTER ALLEN.

Gentlemen: When this association was organized three years ago, it did not contemplate meetings of this kind. Its three primary objects were to act as a clearing house for fire fighting and forestry methods for the existing Idaho and Washington patrol associations, to engage in publicity work to help these associations and to encourage the forming of new associations in neighboring states which should both protect more territory and join us in the two preceding activities. We hoped to get more solidarity and co-operation for forest protection and management within the Pacific Coast timber industry itself, but had few ideas beyond this.

But incidentally we started a movement of far greater significance which, although not foreseen because it had no precedent, now shows to have been a wholly logical development. When practical men, representing varied conditions and free to experiment in ways forbidden by red tape or the petty economies of public appropriations, began to get together to perfect the organization of patrol systems, selection of wardens, fire-fighting methods, and field equipment, state and federal officials became greatly interested and joined in the conferences.

We soon found they had much to teach us also. Both found that, once we understood each other's problems and sincerity, we could work together in the field with greatly increased efficiency. Our modern publicity methods were already advertising both the evil of forest fires and our earnest effort to combat it, thus reducing carelessness and obtaining credit for our industry. It was another step forward when we could show that private and official co-operation was giving the community's resources better protection, as well as providing a safeguard against selfish conduct by lumbermen or political domination of official conduct. In short, we had hit upon a medium for helping not only each other, but the public; strengthening both with the public as well as removing any suspicion or friction among ourselves.

Year by year this triple alliance of private, state and federal agencies has grown stronger, both in conference and field, with increasing public confidence, until any measure we endorse is regarded as practical, fair and sound, representing joint experience and endeavor. Our meetings that began with a few of us around President Flewelling's desk now require a hall that will hold representatives of every forest interest in the West, from two nations, and their printed proceedings serve as a manual wherever forest protection is studied on this continent.

This Season's Fire Work.

About a third of the timber of the United States is represented here by its protective agencies. While these will report separately, I want to give you a few collected facts that show what the organized private owners of the Pacific Northwest are doing as a whole, besides talking at meetings, and why United States Forester Graves says the country needs lumbermen elsewhere to follow our lead.

The privately-managed organizations allied with the Western Forestry & Conservation Association patrolled this year approximately 20 million acres, containing fully 500 billion feet of timber. This means that they protected just about a fifth of the nation's entire supply.

They kept about 450 patrolmen in the field, supplied these with the necessary extra help to handle fires, and built hundreds of miles of telephone lines and trails. What is more to the point, they kept the area of merchantable timber burned over down to 14,000 acres, or about a 16th of one per cent of the area protected. Only about 700 million feet of timber was damaged by fire and most of this will be logged without loss. The actual destruction was only about 76 million feet, or about a 70th of one per cent. They spent, to make this remarkable record, about $200,000, or a cent an acre for the entire area guarded, although, as it was necessary to protect fully double the area that actually contributed, the cost to association members averaged about two cents an acre on their own holdings.

It was not a bad fire year. There is less opportunity to boast of spectacular expenditures and results. But organized fire work is like block signals on railroads; its efficiency is measured by its sureness of operation, whether emergency comes or not, and it is hard to say to what extent luck or preparation averts disaster. Experts know there was great improvement in fire organization this year. We could have met a severe test better than ever before. Some new experiments proved this absolutely, others are debatable. Next year may tax us to the utmost, so this meeting should sift these things out.

Probably the most important developments are

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in private and official co-operation in actual syndicate patrol, systematizing of slash disposal, and growth of railroad interest. I wish to emphasize the former. All five states, except perhaps California, have done much this year to reduce the twilight zones where neutral territory was neglected, responsibility was hard to fix, expenditure was hard to divide if assumed by one, or where there was duplicate effort or conflict of authority. The leaders in all three agencies conferred to divide territory, agree upon men, exchange authority, fix financial responsibility, and generally arrange for increased efficiency at less cost to all. The Weeks law, allowing federal funds to states that will meet them, was immensely effective in cementing this alliance and for this reason is one of the most valuable pieces of recent forest legislation. We should make every effort for the continuance of this fund, which is nearly exhausted.

Publicity Work.

About 800 newspapers, from Montana to northern California, received our fire bulletins throughout the season. These are compiled from information sent in simultaneously by all the organizations in our territory, private and official. They are written in newspaper style so as to require no editing and bear release dates so every paper knows it is not printing matter already used. Their reliable up-to-date news, obtainable from no other source, make them widely printed, while enabling us to work in topical precautions to the public, counteract sensational misleading fire stories from other sources, and keep our own fire work well advertised. Occasionally we accompany them by editorials or verse on forest subjects.

This year's circular work was confined chiefly to the "Keep Them Green" pamphlet for general distribution and the "Ambitious Tree" story for public schools. Over 30,000 of the first were distributed by fire wardens, mailing lists, business houses, county officials, ministers, hotel folder racks, dropping them in rural mail boxes, and other devices. The Forest Service put out another 6000. The "Ambitious Tree" was first printed in state Arbor Day bulletins and teachers' journals for reading to the pupils. We sent out 200,000 more to schools in wooded regions, with instructions from state superintendents to the teachers to have children take them home to their parents. Such work we can do immensely cheaper than local agencies, through the saving on large quantities, but we are limited in its extent by lack of funds.

We issue 100,000 of the "You Share It" gummed stickers for use on envelopes, signs, posts and walls.

An experiment with 6000 colored pictorial posters, instead of the old-fashioned text fire warning, was not wholly successful because of the printer's mistake in colors, but we can apply the idea to better advantage next year. They are cheap in large numbers.

Our book, "Practical Forestry in the Pacific Northwest," continues in demand, widely advertising the northwestern lumberman's progressiveness and putting his problems before an influential class. It is much used in forest schools and libraries. The New York State Library Purchase Bulletin, the standard guide used by all American libraries, lists it among the 1300 best books out of 11,000 printed last year. Some railroads have put it in their observation cars.

We make a strong point of preparing material for use by other agencies without expense to us. This year every important railroad on the Coast printed fire warning material in summer timefolders. Most telephone directories contained it, together with an offer of help by exchange operators in seeing that reports of fires reach the proper fire officer. Several associations carried the idea further by furnishing their wardens printed address cards to post near suitable phones. Our circular suggestion of cards in smoking cars, cautioning against throwing burning matches or tobacco from trains, was adopted to some extent. Where such suggestions need local dress, we pass them through our constituent associations and public forest officials. Among such are catchy fire warnings, mottoes for checks and stationery, special folders to be handed garage and livery patrons, game and fire law cards to be given sportsmen by gun stores and license officials, material to go on guide maps, mottoes for cross-road guide boards, etc.

Public talking is more effective than we are apt to think, because printed accounts and proceedings carry the talks and resolutions far beyond the audiences present and because recognition on the program often advertises our creditable reputation. We prefer audiences unfamiliar with forestry and lumbering problems, therefore needing education, like Chautauquas, granges, clubs and conventions; unless on the other hand, like forestry conventions, they need guiding in specific matters. During the year I have talked at a great many such meetings in all our five states except Montana and as far east as Indiana. An equally important function is furnishing information for speakers, writers, committees and official boards having to deal with forest subjects and who call on us as authority. You would be surprised to know how much such stuff appears just as we prepare it and the work of research and writing it entails.

Assistance to Constituents.

We have been able to act for the local organizations in many matters hard to classify. It is a task to get up these meetings. During the season in which no meetings are held, we collect and exchange ideas, news and court decisions from all three agencies concerning protective methods, publicity and law enforcement. We have taken up with bond and investment houses the bad effect of depreciating fire hazard and secured from them most influential active help in getting their clients to support patrol. We are now arranging with the Post Office Department to place fire warnings for which we submit copy in all forest post offices and over the Postmaster General's endorsement. We have made expert reports on forest legislation and taxation questions to committees interested in such matters in several states. We have assisted in forming several new associations.

Future Plans.

While the foregoing report does not cover all the year's activities, it indicates generally how our money was spent. It is more important to discuss future projects. It seems to me the general publicity policy should be continued, putting old devices in new dress and introducing many we have never employed. This is almost wholly a question of money.

An idea worth considering is acting as the country's experiment station to test ideas and equipment in fire work. It would certainly be strong advertising and might be very useful directly. We are all interested in the possibilities of special telephones, wireless, spark arresters, tools and equipment, brush disposal methods, etc., that none of us can afford to try out because of enforced economy or fear of appearing impractical. By cooperating with selected constituents to get the field work done, but distributing the cost and taking the responsibility purely as experiment, the association might put everyone years ahead in the good ideas and save loss with the bad ones.

A legislative season is at hand. Without interfering in local affairs in any way to embarrass our constituents, the association should be able to assist them to the utmost. To do this requires not only the general material we are best able to collect, but all possible knowledge of each local situation and the steps being taken to meet it, in order that this also may be passed on if of service elsewhere. I feel strongly that those who can post us on such matters should do so fully and promptly. Moreover, forest legislation is of more than local effect and should have all the concerted effort consistent with varying local conditions.

But since most subjects governing our future work are to be taken up in detail by this meeting, I shall not discuss them now further than to emphasize that their association bearing should be kept in mind. A danger in association work, as well as in individual business, is continuing undue attention to matters important when first undertaken but now so well in hand that they are less urgent than things we then neglected. Our fire association found organization the most urgent

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first problem. After solving this human problem they were slower to perfect in equal detail the mechanical facilities of communication and equipment necessary to secure highest efficiency with least man power. Similarly, many branches of effort we allied to work out centrally are no less important than at first, but are so well systematized that we can devote attention to others. If any topics discussed at this meeting suggest useful association work, we should perfect our systems, central and local, to handle it properly.

A word more on co-operation as a principle. If our movement has been valuable in bringing about friendly relations between all elements involved, in actual accomplishment of practical things, and in building a latent strength we may sometime need more than we have needed it yet; it is illogical not to apply it as continually as possible in every day business. There should be systematic, rather than accidental, conference between private and official authorities to arrange co-operative and overlapping patrol agreements, appointment of Weeks law men, division of fire costs, etc. It should be a rule that every interesting step or suggestion by any of us is synopsized and sent in at once for transmission to the others, instead of left for them to find out after the season is over. Our constituents should study ways to utilize the central facilities more frequently in local matters and should call upon us. In no other way can we do most for the money. We cannot discern local opportunities by clairvoyance.

Associations modeled after ours are growing up in the lake states, in New England, even in Quebec. I met their leaders at the recent Conservation Congress and find that, while they have not gone as far as we have in working with official protective agencies, they are very progressive in their own fire work. We hope to keep in more regular touch with them. At the conservation congress Chief Forester Graves, Capt. J. B. White, the well-known Kansas City lumberman, and myself were constituted a committee to represent the working forest protectionists, public and private, in conferring with the American Forestry Association and the next congress to secure adequate and proper recognition of forest problems in their meetings and publicity. We hope our beginning acquaintance with British Columbia will grow into systematic relations of mutual benefit.

It all sums up to this. We have a framework and a good will on all sides that have united every interest in this room for more efficient work. We have proved the advantage of co-operation in everything to which we have applied it. Consequently it is logical to extend it, perfect it, and apply it more. But as we are an aggregation of units, success in this depends mainly on the active support, help, and suggestion of each unit. (Applause.)

PATROL ASSOCIATIONS' WORK AND EXPERIENCES IN 1912, REVIEWED FOR EACH STATE

Following the report of Forester Allen, the experiences of private owners in Montana, Idaho, Washington, Oregon and California during 1912, were briefly reviewed by states.

MONTANA.

W. E. Wells, vice-president of the Northern Montana Forestry Association, reported as follows:

Mr. Wells' Report.

Gentlemen: The Northern Montana Foresty Association is pleased to be represented in the Western Forestry and Conservation Association, and we take pleasure in giving you a report in brief of our work and experience during the past year.

A. E. Boorman was appointed Chief Fire Warden to succeed himself for the year of 1912. The co-operative agreement entered into between the Association and the Government during the year of 1911, was renewed for the year of 1912.

The agreement specified the number of patrolmen to be furnished by the Association and the basis on which the total fire cost should be prorated.

The total cost each year was prorated on an acreage basis and the Government paid sixty-five per cent in 1911 and fifty per cent in 1912 of the total fire cost. The difference being due to the increased acreage of the Association in 1912.

The total fire cost for 1912 was $65.80, one-half of which was paid by the Government. While this represents the total cost of our Association fighting fires, it does not represent the total cost of placing all fires under control as the Association handled two fires that burned over eighty and eighty-five acres respectively, the cost of which was paid by the parties responsible for the starting of the fires. This amounted to practically $100 in each instance. It was proven beyond a doubt that the parties responsible for these two fires were liable, but acting upon our best judgment we considered it best to have them pay all cost of the fire instead of a fine, which in our judgment impressed upon the general public the importance of the Association and their authority to take charge and place fires under control. Experience has taught us that this method is much more effective with the public than paying fines.

The territory embraced within the co-operative districts both years aggregate 964,160 acres. This area is divided into three districts designated as districts No. 1, 2 and 3. District No. 1 contains 180,000 acres, No. 2 contains 483,840 acres and district No. 3 contains 299,520 acres. Owing to the favorable weather conditions this year which prevailed in practically all parts of the country, it was not deemed advisable to put our patrolmen in the field as last year. All fires or smoke were reported promptly to the office of the Fire Warden by phone, who immediately left for the scene of the fire and took charge until placed under control.

Owing to the promptness in which all fires were handled, the majority of them were confined to ten acres or less.

The Great Northern Railway runs through our districts with their main line and their officials have never refused to co-operate with the Association. They have given our patrolmen the right to ride on any train and the use of section men and tools when needed.

The railway company is cleaning its right-of-way of all brush and combustible material as fast as possible. This work is being done through the request of the Association and we are confident of the railroad meeting all reasonable requirements promptly.

In case of fire we have always had the support of the citizens in general in way of furnishing meals, tools, horses, etc.

It might be well here to mention that the majority of our acreage is listed by members owning 640 acres and less and they are scattered throughout the districts which enables them to report fires as promptly as the paid patrolmen. All patrolmen and timber owners are instructed to report as soon as smoke appears. The same attention is given to all reports by the Chief Fire Warden whether it develops into a fire or not.

The Chief Fire Warden sees that all fire laws are distributed throughout the district early in the fire season, also sees to it that all fire literature is given to our County Superintendent of Schools and they are requested to distribute them among the district schools throughout the entire timber zone.

During the season of 1912 we have had eight fires, burning partially over 251 acres; timber damaged 5000 feet; value of damage, $15; cost of fighting the entire fires, $65.80. Fifty per cent of this cost was paid by the Government.

Cause of these eight fires: One by lightning, three parties cleaning land, one accidental burning of a cabin, one spark from Great Northern Railway locomotive, one the burning of a hay stack which spread to the forest, and one fire breaking out the second time caused by the burning of hay stack.

The total area within the co-operative fire district, 964,160 acres, divided as follows:

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Northern Montana, Forestry Association, 359,662 acres.

Government, 345,317 acres.

Held by non-members, 259,181 acres.

Making a total of 964,160 under the direct supervision of the Association and Government. During 1912 we added ninety-eight members representing 155,692 acres.

Assessment for 1912 one-half cent per acre on 359,662 acres, $1,798.31. We have in the treasury $615.64.

For the reason that our holdings are situated in a district that is fairly well opened up with roads and supplied with telephone service operated by the Government and private lines, it has not been necessary for our Association to be under any other expense than maintaining the Chief Fire Warden Office, patrolmen supplies, tools, etc.

We are very fortunate in having a combination man that can fill the position of Chief Forester as well as the position of secretary of our Northern Montana Pine & Larch Association, and we are very proud of our organization and the man we hold responsible. (Applause.)

IDAHO.

In the absence of A. W. Laird, president of the North Idaho Association, Secretary Cornwall read the report from Idaho, as follows:

Mr. Laird's Report.

Gentlemen: I always enjoy a feeling of pleasure and pride in making a report to you at these annual meetings on the operations of the four local fire associations of Northern Idaho.

While these four associations are separate and independent organizations, with well defined territories in which they operate, they are, in a sense, subsidiary units of the North Idaho Forestry Association.

Through this central organization the officers and members of the four local fire associations of Northern Idaho are enabled to meet and exchange their views and experiences, standardize methods, equipment and accounts and adjust the small differences which occasionally arise in all such undertakings.

There are over 4,000,000 acres embraced within the boundaries of these four associations. Of this area the association members own 1,480,000 acres, or about 37 per cent, and this area is increased 178,000 acres by holdings of non-members who contribute varying amounts to the support of the work. It will be seen that these associations patrol and fight the forest fires on an area two and a half times as great as the area from which they derive any revenue, either from assessments or contributions.

It is not an uncommon experience for us to go to the assistance of some careless settler who has let his clearing fire get beyond his control, thereby endangering his property, if not the lives of his family, and then have him demand wages for fighting the fire because, if neglected, it might endanger the timber of association members in the vicinity.

Telephone Systems.

No feature of our work better illustrates our constant effort to keep abreast of the times in the most approved practice than our telephone systems. While last year we owned but 57 miles of telephone lines, this year we have over 163 miles of lines constructed, owned and operated by the associations, and there are no better constructed lines anywhere in the forests of this or any other country. Much of the wire is No. 9 and none that I know of is smaller than No. 10. All wire is B. B. grade and heavily galvanized. The instruments, electrical equipment, appliances and supplies all represent the latest and highest types in their class and our experience has already demonstrated the economy and satisfactory efficiency of this high quality of construction and equipment.

While 163 miles may not seem like a very extensive telephone system it must be borne in mind that 18 months ago we had none. It should also be remembered that much of our territory is cobwebbed with farmers' and settlers' lines, besides those of the larger telephone companies. We have connections with practically all of these.

In the light of what experince we have had I feel that, next to plenty of well constructed trails, no money can be spent to better advantage in the protection of our timber than in building good telephone lines and equipping them with the best instruments and appliances we can buy.

We have $9,000.00 invested in these lines, which cost us about $50.00 to $60.00 a mile, including all equipment, labor, supervision and overhead expense.

Cleaning Out Old Trails.

We have always felt that on our ability to get to all parts of our territory quickly and easily depends our success in fighting and preventing forest fires. On this theory we have spent large sums each season in thoroughly cleaning out all trails which experience has taught us are useful or necessary. In this way we keep open hundreds of miles of trails which were originally built by homesteaders and since abandoned, as well as our own trails built especially to meet the exigencies of our present or possible future needs.

We have cleaned out 684 miles of such trails this year and I think it is safe to say that we can get to within three miles of any point in our territory on a good trail and a reasonably easy grade.

Although these trails do not show among the assets of our associations they are unquestionably worth more to us than anything we have as timber insurance.

Cutting New Trails.

Ordinarily we spend a great deal of time and money in carefully laying out and building new trails where previous experience has taught us they are needed. Although, owing to a generally rainy season, we would have spent much time in cutting new trails this year, except in the case of one association, we cut fewer miles than usual because of the fact that we devoted so much time to establishing look-outs and in building telephone lines.

We built 58 miles of new trails and three miles of wagon road this year, whereas, under ordinary conditions we would have done very much more of this kind of work.

With us money spent on cutting new trails is money well spent and I have never heard a suggestion that we economize in this field of our operations. Well built trails and easy grades mean small fire losses.

Organization.

The season of 1912 has been one of the most favorable we have ever experienced from the standpoint of precipitation. While I have weather reports from only one association, and these can not be said to accurately show conditions throughout Northern Idaho, they are so nearly representative of general conditions that they will serve to enlighten you on some features of my report which seem to show a backward step since my report to you last year.

The weather report to which I refer shows that from June first to September first we had but two weeks during which there was not some precipitation and all other weeks show from thirteen-hundredths of an inch to over two inches. The total rain fall from June first to September first exceeded four and one-quarter inches. The average minimum temperature was 54 degrees and the average maximum temperature 87 degrees.

From this it will be seen that we did not face a very serious problem in protecting our timber this season. The nights were cool, the days temperate and the rains frequent and fully adequate to protect us pretty thoroughly from fires.

In view of these climatic conditions it was wholly unnecessary for us to put out a large patrol force and the fact that we had only 13 patrolmen in June, 59 in July and 84 in August does not mean that we did not give our timber the fullest protection, but, rather, that our officers and fire committees watched conditions carefully at all times and economize whenever and wherever it was possible to do so without jeopardizing the efficiency of the organizations.

While the total number of men employed was a little smaller than usual they devoted more of their time to cleaning out old trails, building telephone lines, blazing up projected trails, marking

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up the section lines where they cross established trails and establishing and erecting lookout stations.

Even as it was we maintained a patrol unit of less than 70,000 acres in July and 48,500 acres in August which, I think, compares very favorably with the size of the patrol unit maintained by other forest protective agencies in unfavorable seasons.

Please bear in mind that this patrol unit is based on the total acreage within our boundaries and not merely on the acreage of numbers and contributors.

Financial.

Although I have not the itemized figures I should like in order to present to you a detailed statement of the expenses of our operations, I can say that we have expended in excess of $40,000.00 this season and I believe that every cent of it was well spent. Over $35,000.00 of this amount was raised through assessments on members and contributions.

Of course it will be understood that much of this money goes into more or less permanent assets such as camp equipment and tools, horses, harnesses and saddles, headquarters, warehouses and look-out buildings.

Fires.

You will naturally be interested to learn the net results of all our activities and rather large expenditures for, as business men, you want to know whether the "game was worth the candle."

We had forty-eight fires which were large enough to report besides innumerable little fires which our patrolmen thought too small to take note of.

These fires burned over an area of 2,000 acres, of which 300 acres had merchantable timber on. We had 17,500 feet of saw timber entirely destroyed and 1,900,000 feet fire killed besides burning up $2,500.00 worth of logs, poles and ties. Every foot of the saw timber fire killed can be salvaged without loss, if logged within a year or two, which unquestionably can be done.

The causes of our fires were as follows:

Old slashing fire breaking out	15
Lightning	12
Unknown	8
Settlers clearing land	8
Campers	2
Locomotives	2
Cigarette	1
Total	48

To my mind this is a record of which we may be justly proud when the size of our territory is considered in connection with the fact that throughout the entire area we have active logging operations on all scales from the smallest to the largest; hundreds of miles of railroads; beautiful mountain fastnesses which entice campers from all over the country; well stocked trout streams that lure the disciples of Isaac Walton to their shady banks; soil of such fertility that thousands of settlers are glad to clear the lands of its brush and stumps in order to get the enormous crops which so abundantly repay their labor in clearing; and a climate which, while ideal for crops, increases our problems in fire protection.

Conclusion.

I feel that no money which we of Northern Idaho put into our business yields as large returns in tangible results as that spent for fire protection of the kind afforded by our Northern Idaho Associations.

Summarizing the requisites of successful effort year after year in preventing and fighting forest fires I would insist on keeping the entire organization out of politics and in the hands of those whose investments are at stake; giving the field positions to men of experience who have proved their good judgment and loyalty; eliminating all men whose principle recommendations is that they are their father's sons; building plenty of well constructed and graded trails; keeping all avenues of transportation and travel open during the entire fire season; having first class telephone lines connecting advantageously located look-outs with headquarters; plenty of equipment and good tools for any ordinary emergency, located so as to be readily accessible from any point; and last and most important of all, a fire committee and officers of high executive ability who know the country and local conditions and will give freely of their time during the fire season.

With these requisites, which I consider indispensable, and such opportunities for cooperation and the exchange of experiences between practical men as are given by these meetings of the Western Forestry and Conservation Association, I think we may look forward with certainty to a continuance of the same success which has attended our efforts to protect our majestic forests from the ravages of fires which experience has shown can be largely reduced, if not wholly prevented. By such cooperation and association work, Idaho has taken her rightful place in the front rank of states where practical conservation of our forest resources as an accomplished fact has taken the place of the unbusinesslike theories of the conservationist who fights forest fires while comfortably seated in a luxuriously furnished office 2,000 miles away from any timber which is worth protecting. (Applause.)

WASHINGTON.

In the absence of Geo. S. Long, president of the Washington Forest Fire Association, the report from Washington was given by B. W. Bawden, treasurer of the Association.

Mr. Bawden's Report.

Gentlemen: Unusual weather conditions in Western Washington were experienced during the past season. May, heretofore considered to be safe from forest fires, so much so that this month is not included in the close season designated by the State law as beginning June 1st and ending October 1st, proved this year to be an exception. Dry weather set in early in the month, culminating about the middle of the month in three very hot days when a strong east wind carried fires which had been burning in logged-off lands into the timber, in a few hours sweeping through large areas of green standing timber. We estimate that the timber killed in these May fires is 400,000,000 feet, but as this was nearly all close to logging operations it will be salvaged without loss. Less than 17,000,000 feet were actually burned and destroyed.

During the months of June, July and August, no serious fires occurred in Western Washington.

The Washington Forest Fire Association patrols an area of about five million acres, out of which 2,700,000 acres are listed with the Association and bear the cost of the patrol. Besides the Chief Fire Warden, the Association had twelve inspectors and eighty patrolmen in the field during the season. Besides the regular patrol, additional men are hired in cases of emergency to help extinguish fires. Our organization has expended $39,000 during this year or 1.45 per cent per acre of timberland listed in the Association.

The Association men are all commissioned State rangers-at-large and have power to issue burning permits and make arrests for violation of the fire law. During the season 2903 permits to burn were issued by our rangers.

The most important feature of this year's work was the slash burning campaign and the appointment of patrolmen under the Week's law. The State of Washington this year having secured $10,000 of the Federal appropriation for patrolling of water-sheds, enabled the State Forester to appoint thirty-three additional patrolmen.

The slash burning campaign in which approximately 30,000 acres were successfully burned over during the season, is perhaps the most important feature of the year's work. The Chief Fire Warden will handle this subject in a special paper to which we call attention.

Another feature of the work that was inaugurated this year was the trespass work. We have made it a practice of furnishing our rangers with maps of their districts showing in one color the timber represented in the Association and during their spare time they were employed in looking up possible trespass in connection with their other work. I think this is a feature of our patrol work which can be enlarged upon with benefit to our members. We discovered a number of cases of trespass and assisted the owners in collecting what

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was due them on this account. As during former seasons, our patrolmen have also at odd times been employed in brushing out old trails where found necessary in order to quickly reach various places and we have continued to contribute toward country telephone systems where such lines penetrate timbered regions.

The Washington Forest Fire Association increased its membership during the season by adding forty-seven new members to its roll. That greater interest than ever before is taken in the work for forest fire prevention is evident. Loggers, millmen and the public in general are every year showing an increased willingness to co-operate with the Government, State and private organizations. With all these forces working in harmony, the effectiveness of our association has been greatly increased and the future appears very bright. (Applause.)

OREGON.

Charles G. Briggs, vice-president of the Oregon Forest Fire Association, gave his report from Oregon as follows:

Mr. Briggs' Report.

Gentlemen: Oregon is able to report not only a most favorable year with few losses, but one of progress in the organization and systematizing of protection effort.

Early in the year the Oregon Forest Fire Association, working with the State Forester, undertook the organization of county co-operative patrol associations. Such organizations were formed and in operation the past summer in Linn, Douglas, Western Lane, Clackamas, Marion and Columbia Counties. Previous to 1912 similar organizations existed in Klamath, Lake, Coos and Jackson Counties, so that we now have co-operative patrol associations in ten counties. I think all members of the various organizations, even though they were not entirely satisfied with the methods employed in some details, agree that the plan has proven a success and with the experience of the past season as a guide, very efficient work is looked for next year.

Through the excellent co-operation extended by the State Board of Forestry and State Forester Elliott, it was possible in many cases for timber owners' associations and the State jointly to hire men. This plan proved equally advantageous to both parties and effected a considerable saving to both without any decrease in efficiency. As co-operation of this nature between State and private owners can only be effected through local organizations, it is expected that this plan will be extended to every timbered county in the State.

The Oregon law authorizes Counties to assist in fire protection where they see fit. The past season seven Counties through the County Courts extended valuable services in protection work.

We also wish to commend the excellent service rendered by men employed under the Weeks law, regarding which Mr. Elliott will undoubtedly give you more detailed information.

The season of 1912, although extremely favorable, was marked by greater interest in protection on the part of timber owners than any previous year. A large acreage in Oregon previously poorly patrolled, was last summer given efficient protection and a number of owners who previously had expended no funds for patrol, either joined the county associations or independently put on wardens.

Some 250 privately paid wardens, in addition to those employed by the State, were patrolling the approximately 12½ million acres of timber in Oregon outside the National Forests and about $70,000 was expended in this work.

Owing to the favorable season, trails and telephone lines were largely extended and will assist in giving better protection next year. This work was to a large extent performed by the wardens.

The peculiar feature of the past season was that practically all of the fire damage came early in the season, before patrolmen in any numbers had been put on. It has been the custom of many owners in Oregon periodically to burn off in the spring danger places such as old fern patches, deadenings, and other fire traps, in order to lessen the chance of fires getting started. Owing to the continued rains in the early Spring of this year, it was not until May that a favorable opportunity for burning occurred, which was taken advantage of by both timber owner and rancher. A high east wind in a number of places carried fires into the tops and at a time when brush fires on the ground were started with difficulty, these crown fires, in some cases of but a few hours' duration, did considerable damage. Complete figures of timber killed by such fires is not yet available and will not be until a careful cruise is made, for some of the fires were in the more remote districts and in many instances covering considerable areas but only killing timber in patches. It is thought, however, about 300 million feet will cover the timber killed and a large part of this, probably 75 per cent, will be removed before it is a total loss.

As a result of these unusual fires, which prevent reporting a perfect year, some owners favor the absolute prohibiting of burning fire traps. I am, however, of the opinion that if this work is carefully done, under the supervision of competent men, it is a valuable and useful means of preventing fires. However, this season has proven the necessity for the greatest of care in the work.

There was a very good opportunity for fall burning this year, which was not taken advantage of as generally as it might have been, though a great deal of work was done. It so often happens that conditions will not permit of a good burn after the early fall rains have made it safe, that we should ever be ready to take advantage of it when it does.

The cost to the various associations of patrol and fire fighting in Oregon this year, aside from assistance obtained from the State, Weeks law fund and counties, varied from one-half cent to three and one-half cents per acre. The difference in cost can be attributed to three factors: Locality, amount of State aid, and extent of improvement work. In some localities the full estimated forces for an ordinary year were kept on the entire season, the men being kept busy on building of trails and telephone lines. In other instances the estimated necessary force was only on a very short time, due to the favorable weather conditions. In some localities, too, the State was able to give more aid than in others, such as in sections where the headwaters of navigable streams originate.

Unquestionably the past season has gone far to demonstrate the economy and efficiency of co-operative patrols, the benefits arising from a good forest fire law efficiently administered, and the need of Federal, State and private agencies working together if we are to have efficient protection at reasonable cost.

We feel that the Oregon timber owners owe a vote of appreciation to the Western Forestry and Conservation Association for the important work they have done in Oregon through the agency of Mr. Allen and to their State Forester for the able and impartial way in which he has administered his office the past two years. If we get the increased appropriation from the next Legislature that we are confident of it will be due very largely to the manner in which the work of the State Foresters' office has commended itself, not only to the timber owner, but the public at large. (Applause.)

CALIFORNIA.

R. D. Swales, manager of the Redwood Fire & Protective Association, reported as follows for California:

Mr. Swales' Report.

Gentlemen: It has only been within the last two or three years that timber owners generally in the section of the redwood belt that our association covers have conceded that forest fire protection for the redwoods was necessary. Although some of us have been working on the problem longer, the association was not formally organized until January, 1912.

On account of the redwoods lying so close to the Pacific Ocean, subject to ocean fogs throughout the dry season, it is not as difficult a problem as where the hazard is serious. With trails built throughout our territory, giving easy access, one patrolman can cover considerable ground, for by riding along on the tops of ridges he is able to see a fire a considerable distance. We have found that some 100 thousand acres can be covered very ef-

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ficiently with two patrolmen. Another thing which helps us is that redwood being very fire resistant, on account of its thick bark and dense growth, a fire will not start as quickly or run as fast as it will in your pine or fir country. We never have a crown fire, so the damage done in the redwoods is mainly to the tan oak and pine and to a very small percentage of redwood around the base of the tree. It never kills the tree.

In redwood logging an operator nearly always has a year's run of logs chopped ahead of his logging, and before actual operations begin fire is set in the choppings to burn the bark, tops and other debris. This method does away with the slashing menace, for what is left on the ground after logging operations is very small. These logging fires are in no way a menace to surrounding timber, for, in the first place, a large crew of men is always available to fight fire in case it should get in the green timber. In the next place, these logging fires are hardly ever allowed to become a very hot fire, for just as soon as it has accomplished its purpose in burning up the bark, tops, etc., men are sent right in to put the fires out. Following out this method, a very small percentage of our saw logs show the effect of fire.

The slashings that we do have to look out for are where split ties have been made. These ties are made throughout the redwood belt by the small as well as the large owner, and the debris left after such operations should be burned at the right time of year. We figure next year in our territory to take care of these places through association work.

On account of having heavy late rains in the Summer and early rains this Fall, the fire situation throughout the entire redwood belt has been very good. There are no fires of any size started or any loss in the redwoods.

We have completed over 75 miles of trails, averaging in width from 30 to 60 feet, according to the character of the country they were built over, and at a cost of approximately $20 to $30 per mile. Our patrol assessment is additional to this, being a cent an acre this year. When the association was first organized the territory was limited to one district, but it is the intention, if possible, at our next annual meeting to extend over all of Mendocino County, taking into our association such timber owners as are willing to support such work.

We have tried by means of lantern slides at local moving picture theatres, by writing articles for our local county papers, and getting out notices which we have posted throughout the territory, to help educate the community in our own immediate vicinity to the loss they stand from forest fires.

Now all this has been for redwood and the same idea carried out in the pines might not work out as well. In all California forest legislation the difference of conditions should be borne in mind clearly. Although our pine and redwood districts have equal claim to protection, it should be well understood that detailed regulations desirable in pine country might work hardship in our redwoods. We fear most in the making of these laws that the differing conditions of these two forest trees and consequent necessity of flexibility will not be taken into consideration, or else that laws may be made that will not apply to either one.

We need associations like our own throughout the forest regions of California, who, being on the ground, knowing the conditions of their separate districts, would be able to accomplish a great deal of good locally and also, by working with a central organization like the California Forest Protective Association, tend to insure the fullest understanding by all elements dealing with forest matters. In this way we could bring out before the public the absolute need of certain laws and the advisability of doing away with others. There is no doubt that each association can keep in closer touch with its own community and handle fire protection to a much greater advantage than a central organization, but the central organization is needed to further the mutual ends of the various small associations.

I am unable to speak in detail of this year's private fire work in California outside our own locality, but can say generally that there is increasing patrol and marked progress in co-operation with the Forest Service. There is more interest in legislation than ever before and lumbermen are being consultd in it. And, as it was an easy fire year with small loss, it is fair to consider it a healthy permanent growth of better sentiment. (Applause.)

SIMILAR REVIEWS BY STATE AND GOVERNMENT FOREST OFFICIALS

United States District Foresters, State Foresters, and the Chief Forester of British Columbia reviewed the experiences of 1912 of the several states, the United States and British Columbia.

DISTRICT OF MONTANA AND IDAHO.

F. A. Silcox, United States District Forester of Montana and Idaho, reported as follows:

Mr. Silcox' Report.

Gentlemen: Rain well distributed gave us one of the best fire seasons we have had for several years. Our annual expenditures for fighting fires usually run about $15,000. This year the total for fighting all of the fires which occurred on the 28 million acres in District 1 (including Idaho north of the Salmon River, Montana, South Dakota, Michigan and Minnesota), protected at an average cost of about 1½c per acre, was $1821.70. The actual amount spent last year for fire fighting was $18,868.28.

Two hundred fifteen fires burned over 2450 acres, out of which only 220 acres of merchantable timber was destroyed, involving a loss of about $3000. One hundred seventy-five of the 215 fires were so small that they were put out by the regular forest patrolmen, no extra assistance being needed. Extra assistance was used in 44 fires and amounted to the employment of 115 men. The causes of the fires were practically the same as given in all of our previous reports, and in very much the same order. The railroads are responsible for 90; lightning, 60; campers, 17; slashing, 10; incendiary, 3; unknown, 35. Notwithstanding the fact that the railroads are adopting better methods, there is considerable room for improvement, considering the fact that they are still responsible for the largest number of fires reported. No arrests were made during this season.

Considerable progress has been made during the past year in perfecting the fire plans of each of the forests in the district. In the fire plan an attempt was made to bring together in graphic shape all of the factors which assist in the prevention and suppression of forest fires. The location of the lookout points, telephone connections, the base of supplies, location of pack trains and routes, caches of tools, points of greatest fire hazard, etc., are included in the plan. The fundamental idea, which was followed in all fire plans of this year, was to make each protective district correspond with the ranger district and make it a complete administrative unit in itself. By this is meant that the man in charge of the district has independent control of his communication, transportation and base of supplies. By making up supply lists for crews of different sizes and furnishing the stores in the vicinity with these lists, it was possible on quick notice to have a bill of supplies made up ready for the field. This also applied to equipment and in many cases the men were furnished with the army intrenching tools, which are so light that in case of necessity they can be packed on men's backs and carried into the more remote portions of the district and the fire attacked when it is small. This advance crew is then followed up, if necessary, by a larger crew equipped with the regular tools, such as shovels, mattocks, and axes. Experience proves that a light kit of tools similar to the army intrenching tools is a very essential part of the fire protective equipment.

To further protect the system of communication, there has been constructed during the past year 450 miles of telephone lines. This gives a total to date of 2650 miles. Most of these lines are

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constructed in the heavily timbered forests, and are put directly on the trees by means of the split tree insulator. They are constructed at a cost of from $40 to $70 per mile, depending upon the amount of swamping necessary. Approximately 270 miles of trails have been constructed, giving a total of 5270 miles of trail to date. Between 140 and 150 pack horses were purchased during the year. The purchase of the pack horses and the strengthening of the transportation equipment in the District is one of the most important steps taken during the year. In heavily timbered regions like northwestern Montana and northern Idaho, where it is practically impossible to hire horses, enough of them must be owned by the Government to provide transportation during an ordinary fire season. When there is little packing to be done for fire crews, the horses are used in the construction of trails and telephone lines. About 400 to 450 patrolmen were employed in the District. The average area patrolled west of the Continental Divide in the heavily timbered region was 40,000 acres; east of the Divide, where the country is more open and parky in character, 125,000 acres. The season being exceptionally favorable, a large number of the men were laid off earlier than usual.

Practically every agency interested in the prevention of forest fires has co-operated with the Forest Service in District 1. The area covered is as follows: The four Idaho associations, 1,520,054 acres within and immediately contiguous to the National Forest boundaries; the Northern Montana Forestry Association, 963,360 acres; the Northern Pacific Railroad as a land owner, 625,461 acres, which does not include any of the territory embraced in the area of the timber protective association; the State of Montana, 410,919 acres; and 511,000 acres covered by timber companies under special arrangements, making a total of 4,030,794 acres which are being protected under co-operative agreements in which each owner bears his proportionate share of the cost. To prevent conflict, it has been found necessary, where associations are formed, to have all timber owners within the co-operative district become members of the association and co-operate directly through the association with the Forest Service rather than act independently of the association. Following out this plan, the Anaconda Copper Mining Co. and the Northern Pacific Railroad this year became members of both the Idaho and Montana co-operative associations. This greatly strengthened the Montana association, since these two companies were the largest owners in the co-operative territory.

Under the co-operative agreements with the Northern Pacific and Great Northern Railroads, distinct improvement is being made in the condition of the railroad rights of way. Out of the 287 miles of Northern Pacific road in the National Forests in District 1, 88 per cent is now in satisfactory condition. Only 29 per cent of the 281 miles of the Great Northern is in satisfactory condition. The Chicago, Milwaukee, and Puget Sound road is using oil through the timbered region and have set practically no fires. The Idaho Northern branch of the O. R. & N. line from Enaville to Murray is in bad shape, little or nothing being done by the railroad company. A conference was held at the beginning of the season in Spokane with the representatives of the Great Northern and O. R. & N. Railroads with the object of pushing aggressively, if possible, the clearing of their rights of way. Maps were furnished the railroads showing the location of the dangerous strips and also an estimate of what it would cost to clear up these areas given them. With this complete data furnished and with aggressive urging that something be done this year, the railroads in District 1 made some progress. There is yet room for improvement. The work should be put on a project basis rather than depend on the incidental time of the section crews to get it done.

Action was taken to secure funds under the Weeks Law for both Idaho and Montana. An allotment of $3500 was approved for Montana and $7000 for Idaho. Unfortunately, the agreements were not completed until toward the end of the fire season and the amounts were not used. Action has already been taken, however, to make these agreements effective next year.

The telephone companies are co-operating very effectively to prevent forest fires. They put a warning notice at the bottom of practically every other page of their directory with an instruction to notify the local operator in case of forest fires. To strengthen this arrangement the local exchanges have been furnished with the addresses of our Forest officers so that they can notify them in case of fire. The railroads, steamboat lines, and the different chambers of commerce are included in their publications warnings against leaving camp fires unattended and are urging precaution on the part of those who use the woods for summer recreation. This is helping very markedly in creating the right attitude on the part of the public. Summing up, I believe distinct progress has been made by co-ordinating of agencies to insure better fire protection and in the development of our own plans to hold the loss from forest fires down to the minimum during the dry years, which we are sure to have with considerable frequency. I want to reiterate that because we have had exceptionally favorable seasons for the last two years we should not let up one bit in pushing the fire protective work so as to be prepared for the more unfavorable years. We simply must not be lulled into a feeling of security which will make us at all careless. (Applause.)

DISTRICT OF OREGON AND WASHINGTON.

George A. Cecil, District Forester for Washington and Oregon, reported as follows:

Mr. Cecil's Report.

Gentlemen: As far as the Forest Service is concerned, the season of 1912 was one of the most successful in point of damage and expenditures since the establishment of the National Forests. While our patrol force was practically the same as in 1911, though greater than in 1910, the expenditures for extra help in fighting fire amounted to only $5,637.49 as compared with $102,682.33 in 1911, and $172,832.23 in 1910. It would be unfair, however, to give to our protective machine entire credit for this extremely satisfactory state of affairs.

The rainfall during the months of July and August was unusual, and was well distributed throughout the season so that there was seldom a dry period of more than two weeks' duration.

Although the weather conditions throughout the Summer were very favorable toward a minimum fire loss, yet, the fact was strongly brought home to us that even in a so-called "off year," readiness to meet an emergency is of prime importance. For several years we have been accustomed to begin, about June 1 to 15, to increase our permanent force by the addition of guards for fire patrol. This year a dry period came early in the Spring before the new vegetation had started and while last year's growth of weeds and grass lay dead and fully exposed to the sun. As a result, the debris on the ground, especially in old burns, became dry as tinder, and by the middle of May fires broke out which threatened serious damage. One fire on the Quinault River, on the Olympic Forest, caused a loss of about twenty million feet of timber, most of it however on private lands. Fortunately, rain fell soon after, otherwise we might have been hard pressed. Another season we shall be on the lookout for a sudden dry spell before Spring vegetation starts.

Lightning is another climatic feature which, although not presenting a new problem, is seemingly of growing importance. In 1910, 13 per cent of our fires were caused by lightning; in 1911, 30 per cent; and in 1912, 39 per cent. Owing to the inaccessible nature of most of the National Forests and the fact that lightning usually occurs at a more or less high altitude, fires from this cause usually start 30 or 40 miles from a basis of supplies in extremely rough country where it is often necessary to construct several miles of trail suitable for taking in men and supplies. The obvious need of course is more trails and telephone lines. From the funds so far at our disposal the work of placing the National Forests on a basis of efficient protection has been slow. Heretofore, we have had to be content with the construction of trails and telephone lines in the lower valleys and ridges

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near the settlements, while the higher and more inaccessible regions have been more or less neglected. Much of our most valuable fir and yellow pine occurs back in the mountains on the headwaters of streams, in regions of excessive lightning.

Our experience has been that fires in these regions are the most expensive as well as the most difficult to control. Accordingly, we are bending every effort to extend our trail and telephone systems further into the higher mountain regions. On many high peaks permanent lookout stations have been established and telephone connections made with them. During the fiscal year ending June 30, 1912, in addition to building 600 miles of trail we constructed as much telephone line as we had in existence at the end of the previous fiscal year. We will probably double last year's mileage by the end of the fiscal year 1913, so that by next season we will have approximately a total of 4,500 miles of trails and 3,000 miles of telephone lines.

No doubt the most interesting, if not the most vital, factor in the whole fire situation, and one that should be the source of the greatest satisfaction to this association, is the rapidly changing public attitude towards careless handling of fires. This fact was every clearly brought out this past Summer by the great reduction in the number of forest fires, the causes of which can be attributed to human agencies. During the calendar year of 1909, 94 per cent of all fires were caused by human agencies; in 1910, 87 per cent; in 1911, it had dropped to 70 per cent; while in 1912, 61 per cent were reported as due to the carelessness of man. This situation presents a striking commentary on the results of the extensixe publicity campaign which has been waged by the various agencies in the Pacific Northwest advocating fire protection, and particularly by the Western Forestry and Conservation Association. Of course, 61 per cent is still too large a figure, but if the pace set in the past four years is kept up during the next four, the number of fires caused by the careless use of fire will be reduced to a minimum.

Not only did the public in general show a very healthy attitude toward the subject of forest fires this past year, but the railroads in particular gave the question serious and conscientious thought. Today we have both formal written, and informal verbal, agreements with three transcontinental lines by which we are each striving to accomplish the same end and are working in close harmony. Our rangers and supervisors in the field have gotten acquainted with the engineer and track crews so that a mutual understanding has arisen between the men who come in contact with the actual fire problem. This mutual understanding and sympathy is vital and fundamental and must be developed just as assiduously as any other phase of this great fire question.

A great advance has been made during the last year in cooperation between the Forest Service and timber owners. This is particularly true of Oregon, where many local organizations have been formed during the last year under the auspices of the Oregon Forest Fire Association. Until recently the timber owners in this state have depended upon individual effort, but the advantages of coopertaion have been so clearly brought out by your association that Oregon is now in line and well toward the front in cooperative work. This advance has greatly facilitated cooperative work with the Government. The "get acquainted" and mutual understanding policy has been fostered with the result that better team work has been effected between the men on the ground than perhaps has been the rule in the past.

The cooperation between the state and federal government under the Weeks Law which enables the Secretary of Agriculture to assist states which have effiective fire-fighting machinery in protecting the timbered watersheds of navigable streams, has proved of the greatest benefit, not only in furnishing increased patrol, but also in bringing even closer together the various agencies engaged in fire protection. The states of Oregon and Washington were each allotted $10,000 which was expended by the State Forester in giving additional protection to the timberlands of the states. Each state employed a number of patrolmen known as "federal patrolmen," who formed an integral part of the state's regular fire protective organization with the difference that Uncle Sam paid the bill. In this manner the states were enabled to largely supplement their force in fire protection at no cost to themselves, making possible the protection of areas where otherwise little or no patrol would have been possible.

Although the past season has been rather uneventful from a spectacular standpoint, with the usual vivid newspaper stories of raging fires and fleeing settlers, yet, it has not been without its lessons. We know that we must not be caught napping in the early Spring, and that we must keep extending our trails and telephone lines into the regions of excessive lightning. Furthermore, we must not let up on the publicity campaign, for the more the public knows of the danger of fires, the sooner will the forest fire situation be brought under control.

And lastly, I want to emphasize the importance of cooperation—not necessarily formal agreements but the kind of co-operation that means a feeling of mutual friendship and understanding between the men on the firing line, whether they are employed by timber owners, state or federal government, for in my opinion, therein lies efficiency. (Applause.)

DISTRICT OF CALIFORNIA.

Coert Du Bois, United States District Forester for California, in his report said:

Mr. DuBois' Report.

Gentlemen: In California, where it stops raining every Spring and does not begin to rain again until the Fall, it is possible by a study of past records to average certain factors which go to make up the intensity of the fire season and arrive at an idea of a normal season.

The average fire season in California, figured in this way, is a 153 days' drought during which 655 fires occur on the National forests. The season of 1912 lasted 172 days and 795 fires occurred; so as far as these two factors go it was worse than the average by 19 days and 140 fires.

Out of these 795 fires 176 were serious ones, covering over ten acres and doing over $100 worth of damage each; 619 were under 10 acres and 368 or 46 per cent of the total were under one-quarter of an acre in size and did no damage at all. It is on the last class that the comparative efficiency of the protective organization can be figured from year to year. In 1912 all previous records were beaten by 11 per cent.

The 176 fires which did do damage caused a loss of only 2,166,000 feet of Government timber and 1,565,000 feet of privately owned timber inside the National forests. Figured at $2.15 per thousand, the fire loss to the Government was $2,470; to private stumpage owners $2,220, a total of only $4,690. In 1910, with 553 fires, this figure was $398,000.

I have heard fire loss figures questioned, especially for California timber. The figures given above are arrived at by a double cruise of each burned over area—a cruise showing what it would log per acre before the fire, often made long in advance of any fire and filed among our forty estimate sheets, and a cruise of what it would log per acre made after the fire. The difference is the exact stumpage loss figured from the mill man's point of view. Our own figures on value of range and reproduction burned are kept separate and not included in loss statements given to the press. The value per thousand varies with accessibility and the per thousand figure quoted above represents merely the total money loss as reported from the field divided by the number of thousand feet lost.

Another figure we are keeping close track of for purposes of comparative efficiency is the average acreage per fire. For the preceding four years it has run 296, 225, 653 and 125 acres. In 1912 it was 67 acres. In other words, 795 fires burned over 53,642 acres this year, while in 1910 553 fires burned over 361,344 acres.

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Three primary causes were responsible for these results. The first was the approaching completion of our communication system, the value of which is accumulative from year to year, the second was the wide extension of the permanent lookout system, and the third the great increase in the number of men on the rolls during the peak of the danger season.

The lookout stations vary from a costly steel tower with a roofed platform and telescope on top to a flat rock with an old resident with the country in his head on top. Every one is manned from earliest daylight till dark all Summer long and every one is connected by phone. Seventy of these lookout stations were in operation last Summer tied in with 900 phones on the timbered National forests in California.

A study of the records of several hundred individual fires showed us that the intensity of the danger steadily increased from the middle of July to the middle of September when, on account of the cool nights, it began to decrease. A fire that one man could handle in June or late September would require six men in August. With a fixed total of money available for hiring Summer guards, the obvious answer was to hire a great many more during the peak load of danger and fewer before and after. On May 1, 1912, the protection force comprised 358 men, practically the permanent organization. On July 1, 668 men, on September 1, 700 men, the highest number; and on November 1, 417 men.

One particularly encouraging feature of the year's work is the increased growth of co-operative fire prevention between the forest service and timber operators in California. Several formal co-operative cost sharing agreements were in effect and many more informal protective arrangements were perfected between the lumbermen and the local forest authorities. The formation of the California Forest Protective Association last Spring furnishes the means for a still further increase in co-operative forest protection. (Applause.)

MONTANA.

The report of C. W. Jungberg, State Forester of Montana, was read, as follows:

Mr. Jungberg's Report.

Gentlemen: Organized effort through association work is the only method that can be employed in Montana, because our laws are inadequate for forest protection. It is hoped that through this same effort, with the aid of individuals who have given some thought to our forest policy, that our laws will be amended and materially strengthened.

Forest patrol is essential within this State, whether carried on by lumbermen or by the State, when we consider the amount of timberland that is cut over each season. There is left behind the refuse of a cut of 325,000,000 feet, covering an area of nearly 45,000 acres of combustible material, to say nothing of the land that is being cleared each year by settlers who leave more or less slashing in an unsafe condition. With these conditions the fire hazard is most urgent so long as our state laws do not prohibit the accumulation of debris.

Fire hazard could be greatly diminished if the by-products of the cut-over land could be used, instead of being left to make up the bulk of the menace to forest land. To see to it that railroad freight rates on this commodity be placed on a fair basis, so long as markets are almost at our door, should be a part of the work of the Association and of all those who have the welfare of forest land at heart.

Marketing by-products would have many desirable features besides being a large factor in reducing fire hazard, since it would have a tendency to create and conserve. It is hoped that millmen as well as loggers will take active steps for a solution of this problem so important to the state.

Co-operative fire patrol carried on by the State of Montana has grown this year to a proportion of 309,000 acres at a cost of $1,284.14. Agreements were made with the Northern Montana Forestry Association and the Federal Forest Service on an acreage basis. It is safe to say that this timber carries a value of $2,500,000.00 to our state school timber land. From these figures it may be seen that we are carrying a very low rate of insurance.

While our organization is not perfect, we feel we are making progress. Effective fire control can be accomplished only when all elements are brought together to make up a full organization with tools, trails, telephone lines and lookout stations. These are essential in combination with men in the field to do effective work.

Dispatch in getting to fires, after they have been reported, is commendable, but trails and other means of reaching the place quickly are necessary. Ordinarily we calculate that one man should patrol about 40,000 acres, but if the necessary roads and trails are not there, one man cannot cover the area, especially in a rough and mountainous country. It is essential then, to locate lookout stations on high points overlooking the valleys. Telephone lines connecting lookout stations and other points are found to be the surest means of dispatch of business. Our Montana Association is very fortunate in having the use of Forest Service, as well as railroad, and private telephones throughout the district covered by patrol. However, many localities are not equipped. It seems to me steps should be taken by the Association and State to establish main lines at least through forest districts not covered by private and the Federal Forest Service lines. If such telephone lines were established, short permanent and portable lines could be connected with but little expense to lookout points and wardens' stations.

By persistent efforts we have gotten the railroads to come to our assistance in co-operative work more than ever before. Rights of way are in better condition today than they have been for years. I think this condition has been brought about largely by the railroad officials who saw the tonnage, which they so largely depended upon, in our timbered districts, reduced to ashes instead of revenue. Heavy lawsuits brought against the various companies have been an important factor. I have also seen many disastrous wrecks caused by snowslides on mountains denuded of timber by fire. However we have come to understand each other much better and the feeling is growing that we are now mutually protecting each other's interests.

Educating the public to the danger of and losses by forest fires should be the paramount issue in this state. We never can reduce forest fires to a minimum unless the people have full regard for fire laws and their importance. The primary work of forestry, I think, is to teach each and every individual that he is a fire warden on his own woodlot.

If this issue could be placed before the people squarely in interesting reading, pointing out the interests affected by forestry and all that depends upon it, much more study would be given the subject. The cost of the distribution of this work would be large if it were carried out to its full extent, but I believe firmly that it would bring results that would be everlasting. The subject should be given more attention in school work in the lower branches. Text books for the young should be used, since early training will familiarize the people with forestry to a greater extent. Through the child, the parent will come into closer contact with it.

An inadequate forestry law to deal with the problem of conservation of timber, as we have here in Montana, is faulty and perplexing to any one that has been any student of the intents of conservation. Dealing in co-operative measures for the suppression of forest fires, the State has done all it possibly can under the existing State law. We regret that more cannot be done. Our policy has been and shall be to co-operate with all interested parties for the betterment of conditions.

I recommend that the agreements entered into between the National Forest Service and the Northern Montana Forestry Association that were in force this year be continued in 1913, also that our State Board of Land Commissioners make the necessary application for funds to be allotted to this State under the Weeks law. I recommend that every influence possible should be used toward securing better legislation for the protection of timber.

Climatic conditions during the past year have been very unfavorable for forest fires, since the season was the wettest in thirty years, except

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during the spring months, when most of the fires of any importance occurred. The report of these fires as they occurred in different parts of the state follows:

Districts reported, 14; districts not reported, 5; number of fires on National Forest land, 60; number of acres burned over on National Forest land, 244; number of thousand feet timber damaged, 29,000; salvage to be realized on damaged timber, 41 per cent; percentage of land burned, young stand killed, 46 per cent; percentage of land burned over not timbered, 49½ per cent; number of acres burned over, private land, 802; amount of damage, 28,000 feet, $84; men employed on forest fires, 104; expenditures of labor on fires, $769.38; expenditures for tools and supplies, $497.36; men employed on regular fire patrol, 178; men employed as a whole, fire rangers, fire guards and State fire wardens, 243; number of men serving as State fire wardens, appointed by the State, 249. (Applause.)

WASHINGTON.

J. R. Welty, State Forester of Washington, submitted his report through R. W. Condon, chairman State Board of Forest Commissioners.

Mr. Condon's Report.

Mr. Condon, in summarizing Mr. Welty's report, stated that the State had spent about $24,000 in 1912. They had employed thirty-five fire wardens. In co-operation with the Government, under the Weeks Law, thirty-three additional patrolmen had been employed, each bearing half the expense. The State had also co-operated with the Washington Forest Fire Association, helping it pay extra fire expenses. During the year 7048 burning permits had been issued and 180 fires were handled outside of those under permits. During the year five offenders had been convicted and fined for burning without permit; three for operating without spark arresters and one for leaving camp fires burning, making a total of nine. Mr. Condon desired to impress it upon the association that the State of Washington needed another appropriation, and to that end desired the co-operation of all interested. The $75,000 appropriation made by the Legislature was nearly exhausted. They were today back $15,000 or $18,000. The showing they had made should go far toward securing an additional and larger appropriation.

Following the summary of Mr. Welty's report, Mr. Condon said:

We have been organized eight or ten years. At first we met with a great deal of opposition in our work and were looked on with distrust, and every time a patrolman showed up, he met with considerable opposition, and today he is meeting exactly the opposite treatment. We think we have done a great deal of good, and we feel that we are going to do more good, and I want to say before I forget it, that there is somewhat of a political side to all this. I want all the members here from the West to impress on their representatives and senators when they go again to the Legislature that we need further appropriations. Three years ago we got an appropriation of $75,000, the largest we have ever received, and this has been spent in about this manner: The first year took about $35,000, and the second year we had good work, and outside of fires in May, we had no fires to amount to anything, and this year have spent only about $18,000, and a great deal of that has been spent in cutting off old stumps from old burns that render the fire hazard a great deal less. We will turn back to the State something like $15,000 or $18,000 which we will not be able to use. We hope to use this as an argument for getting a larger appropriation, so that we can increase our work and increase our efficiency.

We have worked along the same line as the Washington Fire Association, made up of timber owners, and our secretary and forester who handles the affairs of the board, has worked in complete harmony with them, and we believe in doing that we have accomplished a great deal of good, and we think the world of Mr. Welty; we admire his judgment and patience.

We have caused a few arrests and a few convictions, but everybody accepts the forest fire law and realizes that we are doing a great deal of good, and we have little trouble. We have picked our men carefully, we think. We have said to all of them to use judgment in handling the individuals, and we think we have gotten good results from them. We have taken advantage of the Weeks law to the extent possible this year. We had ten thousand dollars set aside for our use, and we used a portion of it, just how much I don't know, but if we had all of it we could appoint an additional warden given us under that act. We feel that if everybody will pull for us in the next Legislature we can get a good appropriation that will increase our efficiency.

We also realize that there may be some changes in the fire board owing to the different political situation this year. In any event, I feel that work will go on, that we will continue to do good, and with the backing of the people here represented, the people of the Washington Forest Fire Association and kindred associations, we will accomplish a great deal. We are educating the people all the time and getting them to feel better toward our work, and we think as time goes on we will accomplish a great deal. (Applause.)

OREGON.

In the absence of F. A. Elliott, State Forester of Oregon, Deputy Forester E. O. Siecke read Mr. Elliott's address.

Mr. Elliott's Report.

Gentlemen: In several respects the fire season of 1912 was peculiar. It was characterized by a general deficiency in rainfall during the late Winter months over the entire state, and during April and May this deficiency was increased in the northwest portion of the state, in which the bulk of the timber is found, while in other sections of the state the precipitation was slightly above normal. In June, July and August the rainfall was in excess of the average except in the southwest section of the state, where a slight deficiency was recorded. During the fore part of September heavy general rains occurred which made further patrol work unnecessary. The rains which fell during our dry and usually dangerous season (July and August) occurred at such intervals that at no time was the fire danger particularly grave.

The continued heavy rains after September, 1911, made it impossible to burn slashings that we had listed, so we entered upon the season of 1912 with an extra amount of slash burning to be done. This was also true with regard to old burns, windfalls, etc., that we had listed for burning during the Fall of 1911. On April 22 a letter was sent to the principal timber owners in the state, requesting that slash burning be done whenever possible during periods of favorable weather between that date and the beginning of the extremely dry season. This request was very generally complied with, and a concerted effort made to clean up and get ready for the fire season.

From about May 10 to the 15th we had a very unusual dry spell, caused by an east wind, which generally comes in August and September, and a number of fires were allowed to get beyond the control of those in charge. These fires occurring before the state or the private timber holders had their regular wardens in the field, did great damage to timber in some localities that were considered almost immune from the fire risk. Another unfortunate result of the fires was apparently to strengthen the position of those timber owners opposed to Spring burning. In my opinion, however, this experience only goes to show that promiscuous burning is never safe, and that whenever burning is done it must be done with discretion and with a sufficient number of trained men in charge to guard against the unusual, which is always liable to happen.

Our organization after June 1st consisted of 25 supervising wardens, two assistant supervising wardens, two wardens employed by the county courts, 58 federal patrolmen (employed under the provisions of the Weeks Law), 212 wardens employed by timber owners, 92 voluntary wardens and 134 forest service men; a total of 525 men.

Conditions were ideal for the prevention of forest fires all through the closed season, June 1 to October 1, and we succeeded in getting a great amount of trail and telephone work done by the

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regular patrolmen. Two hundred miles of new trail were built, 650 miles of old trails opened up, and 250 miles of telephone lines were constructed. Trail work cost $7,000; telephone work cost $6,500. These figures include the wages of the regular patrolmen during the time they were engaged on trail and telephone construction work. Fourteen lookout points have been equipped with telephones and 95 lookouts were used where no telephones have as yet been put in.

During the closed season there were 267 fires reported, none of which did any damage to standing timber, partly of course, due to the favorable season; yet we feel safe in saying that the thoroughness of our organization had no little part in stamping out numerous small fires that otherwise would have done great damage.

Among the chief hazards demanding our attention for the coming year is the disposition of slashings. While the people generally realize this and are lending us every assistance, yet there are some individuals and companies even among the large operators and timber owners who take advantage of every technicality to avoid the law relative to burning their annual and old slashings.

With the able assistance of C. S. Chapman, secretary of the Oregon Forest Fire Association, we succeeded in organizing five new local forest fire associations, comprising Columbia, Clackamas-Marion, Western Lane, Douglas and Linn counties. This makes a total of ten such organizations in Oregon that are co-operating with the National and state officials in every way possible for the betterment of the service. These associations have been the most important factor in bringing the different interests together and spreading the gospel of fire prevention broadcast over the state. We expect to make another campaign for the organization of additional associations during the coming Spring, and next year we hope to have all timbered counties thoroughly organized.

Where local organizations are in operation, arrangements can be made to have an efficient man take charge of the association work and also act as our supervising warden, thereby having charge of all the federal patrolmen hired by us through the funds from the Weeks Law. This makes it possible to have the entire work under one management, and does away with all duplication of work.

Through the associations it is also much easier to get trail and telephone work done and at less cost. Practically all the trail and telephone work reported above was done where such organizations are in effect, or where the timber owners have a tentative agreement similar to associations. (Applause.)

CALIFORNIA.

G. M. Homans, State Forester of California, sent the following report for his state:

No appropriation has been made for forest protective purposes in California and, at present, her vast timber resources are dependent upon a voluntary fire warden system for protection from fire. This voluntary fire warden force consists of about 1100 public-spirited citizens who have the welfare of the forest at heart. They have the power to make arrests, without warrant, for violations of the forest laws. Under this system and because a fire warden's appointment carries with it no compensation, no regular patrol is maintained. They accomplish a great deal, however, by reporting fires which come to their knowledge; by getting men out to fight those occurring in the neighborhood; by posting fire notices and by distributing copies of the forest laws. They rendered very efficient assistance during the year of 1912 and up to November 1 made 39 arrests. The cases were prosecuted by justices of the peace and the district attorneys. Convictions were secured in 29 cases; in one case the offender was acquitted; three were released; two dismissed; in two cases the fines were suspended and, in another case, because of extenuating circumstances, the offender was placed on probation in lieu of a fine.

This office has definite record of 630 fires occurring within the state. Of this number 545 occurred within or just outside the national forests. These figures were obtained through the courtesy of the Forest Service, who supply us monthly with the number and causes of fires occurring within the national forests. These figures are incomplete since the reports are not in for the entire year. The total area burned within the national forests was 27,000 acres. Of the 85 fires reported by the fire wardens 469 acres was timberland; 30,647 acres grazing land, and 34,804 acres brush covered land.

A lesser number of fires occurred in 1912 than in 1911. This reduction is largely due to the efforts of the voluntary firewardens.

However, this system is inadequate because no patrol can be maintained during the long dry seasons so prevalent in California. Fires cannot be entirely eliminated, it is true, but their number can be greatly reduced by establishing an efficient fire patrol system. During the next session of the legislature another strong effort will be made to secure a much needed appropriation for this purpose.

All the counties in California may appropriate money for fire control, but only a few have done so. In fact, only 22 of the 58 counties provided funds for fire protection in 1912. Ten thousand, nine hundred and seventy-five dollars and seven cents ($10,975.07) was spent under the county firewardens who usually are temporarily employed while acting as state fish and game wardens. Federal co-operation under the Weeks law has stimulated better forest protection in many states, but California has been unable to avail herself of its benefits because there are no available funds.

At present, three forest fire associations exist in California. The Stockmen's Protective Association of Alameda and San Joaquin counties represents 250,000 acres of land and maintains mounted patrolmen during the dry season. These men report regularly to the county fire wardens and the State Forester. An efficient system therefore is in vogue and much good is being done.

The Redwood Fire & Protective Association is composed of redwood lumbermen. They have a different problem before them, for the redwood suffers less from fire than other trees. Most of the severe fires of the present time follow lumbering. After the trees are felled the slash and general debris is intentionally fired to facilitate logging. The redwood country is the only region where slash is intentionally fired. The trees are felled, peeled, trimmed and sawed into logs, then the whole area is set on fire. There is a strong sentiment against the use of fire in cleaning up debris, but until some other less wasteful method is demonstrated, the use of fire will be continued. However, the association has done much good in constructing many miles of fire trails in Mendocino County during the past season. This system of fire trails, when completed, will be of great benefit to all owners of timber in that immediate section. All patrolmen in the employ of this association are also state voluntary fire wardens. These patrolmen work only during the fire season.

The large redwood lumber companies are sincere and may be depended upon to heartily support any measures leading toward the extinguishing and regulation of fire.

The California Forest Protective Association was organized in March, 1912, by lumbermen representing every section of the state, presumably for the purpose of fire prevention and protection. So far nothing has been done and it will be interesting to note the policies which they may adopt.

An investigation was made in the winter of 1911-1912 to determine the area and ownership of the timbered and cut-over lands of the state. Lack of funds prevented this department from issuing a map. However, the data was loaned to the California Conservation Commission and they recently published a map showing this ownership.

A study of forest taxation was also carried on at this time. Taxation data was also gathered from each county. The subject was discussed with each assessor, representative lumbermen, and others interested in the reform of forest taxation.

The study of cut-over lands made this past summer covered an area of 552,303 acres of which 186,758 acres were cut-over and 365,545 acres were virgin. Ten lumber companies are represented in this acreage. Because of the magnitude of the

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task and the limited time available, it was impossible to cover all of the private holdings, but these companies were carefully selected to represent all existing conditions in the tracts under operation, exclusive of the redwood belt. It is safe to assume that the conclusions drawn from this study will apply equally well to the entire region.

During 1912 a study of the habits and location of the various species of shade trees existing in California was commenced. The study is still being continued and will be completed perhaps the latter part of 1913.

Two bulletins were published by the State Board of Forestry in 1912. The demand for these has been so great that the supply is nearly exhausted.

Bulletin No. 2, entitled "Pharmacal Plants and Their Culture," by Albert Schneider, M. D., Ph. D., discusses medicinal plants in California and gives suggestions on cultural methods, preparing vegetable drugs for the market, what drugs may be collected profitably and other information of general interest. Bulletin No. 3, entitled "Wood-using Industries of California," by Andrew K. Armstrong, and published by this department in co-operation with the U. S. Forest Service, has been greatly in demand by the lumbermen and manufacturers. It covers only the woods worked up into finished products within the borders of California. Sixty-six per cent of the timber used by 600 operators manufacturing finished products is grown in California, 28 per cent in Oregon and Washington and 5 per cent in the remainder of the United States; and 1 per cent in foreign countries, including the Philippine and Hawaiian Islands.

BRITISH COLUMBIA.

H. R. McMillan, Chief Forester of British Columbia, read a telegram from W. R. Ross, Minister of Lands, unavoidably absent in Ottawa, regretting his inability to attend as he had expected and expressing to the Western Forestry & Conservation Association his "appreciation of the valuable work it is doing for the whole Pacific slope." Mr. McMillan then reviewed the experiences of British Columbia in 1912, gracefully expressed the thanks of his province for invitation to the conference, and assured British Columbia lumbermen of his sincere desire for their help in organizing his fire force, in one of the most eloquent and earnest addresses delivered during the two-day meeting and was loudly applauded by his hearers from both sides of the line.

Mr. McMillan's Report.

Gentlemen: As the representative of the British Columbia Forest branch, and in a way of the British Columbia lumbermen also, I wish to sincerely and heartily thank the Western Forestry and Conservation Association for your more than neighborly action in inviting us to attend your annual meeting and in going out of your way to hold it in a place so convenient to British Columbia as Seattle. It is in a way so large and generous a courtesy that I think any one would be at a loss for a suitable acknowledgment, and I will simply say we appreciate it fully and with the friendship and cordiality which seems to be a signal quality of lumbermen and foresters the world over, express the hope that in the near future British Columbia can return the invitation.

The Western Forestry and Conservation Association is a true pioneer in actual forestry work. From the start you have avoided reiterating tiresome truths about the need and promise of forestry, and have contented yourselves with actual constructive work. And, as a result, the Northwestern states which are represented in your association, have seen greater progress in the efficient treatment of forest lands than any other region on the North American continent.

You have first of all made the ordinary citizen realize that timber is a vegetable crop which must be sown artificially or by nature, which must be cared for during its long, slow growth, and, lastly, when it has come to maturity, must be harvested carefully, with due regard to the next crop. You have further taught your citizens that timber is, of all crops grown by man to fill the needs of present-day society, the most perishable, and if this crop which is growing on and is the only one that can grow on, millions of acres of land is not cared for and preserved from destructions like any other valuable crop, the loss will be felt by every citizen in this and the next generation.

Much has been said during the last few years about reclamation of waste lands, and I am aware that wonderful results are being obtained by efforts in that direction, but in the final analysis I do not think such efforts can compare with those which you are making toward the reclamation from uselessness of the hundred million acres of mountain land which you have in your five states. You have been able by your work and by your campaign of education to make the people visualize this great reclamation project, and it must, I think, take rank as one of the great accomplishments of the decade. The greatest obstacle to overcome in the reclamation of these mountain lands is, of course, the perishability of the crop at every stage of its life by fire. In the past, owing to many causes it was thought impossible to overcome this obstacle, but your efforts have proven the contrary. And your method has the simplicity of genius. You have simply made the industry bear the cost of protection just as every industry must bear the cost of measures to insure their success. So long as efforts at protection of forests from fire were sporadic and intermittent, the owner of timber found that efforts at protection simply meant lessened profits. But when every timber owner spends money for protection you have found that automatically the cost of protection becomes one of the items of the cost of production exactly like interest, surveying, cruising, insurance, etc., and eventually the consumer pays for it, as he should. Further, you find that you now receive help in protecting your crop from the citizen, the state, and from your federal government, and that at last forest fire protection is an established policy. The protective problem has now become merely a question of methods and details such as confront any industrial problem. Every lumberman and forester and every citizen of the United States and of Canada also offers you his congratulations on what you have done.

Now, as regards the conditions in British Columbia.

As you probably know, the northern half of British Columbia is practically unexplored and uninhabited except by trappers and prospectors. The southern half, which is nearly as large as Oregon, Washington and Idaho, is almost entirely timbered except for the barren summits of the mountains. The total timbered area in this southern half of the Province is about 100,000 acres, two-thirds of which is capable of producing merchantable timber. The forests along the Coast are not greatly different from those along the coast of Washington and Oregon, except that the Douglas fir drops out about 250 miles north of the International boundary, and is replaced by spruce, hemlock and cedar. On the low altitudes east of the Cascades the forest is similar to those in Northeastern Washington, being a mixture of yellow pine, fir, tamarack, white pine, cedar and lodge pole pine. The yellow pine drops out about 150 miles north of the boundary and is replaced largely by spruce. With the exception of a few limited yellow pine areas the forest is everywhere dense, and has a heavy accumulation of debris, which constitutes an exceptionally bad fire risk, although, of course, on the Northern Coast the risk is lighter owing to the heavy rainfall. In the past fire has been particularly destructive in British Columbia, not more than 20 per cent of the forest area being covered with a virgin stand. There is, however, a very large area of excellent second growth which, if protected from fire, will yield merchantable timber by the time the virgin timber is cut off, which will probably be 50 or 60 years hence. The area of agricultural land is proportionately very small, so that it will be seen the lumber industry in British Columbia is absolutely dependent on the protection of her second growth forests from fire.

Last Winter Parliament passed a most excellent forest law which provides for the regulation of railways, the disposal of slash along roads and other dangerous places, the construction of fire breaks about logged-off areas, requires settlers

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and others to obtain permits to burn during the season from May until October, and make provision for the establishment of a forest department to have charge of the enforcement of the fire laws and a patrol and fire fighting force of men.

The Province experienced an extremely dry Spring before the patrol force was put on and a number of serious fires occurred in May. The Summer was a very wet one, and no trouble with fires was met with except in the northern part of the Province. The patrol force consisted of seventeen divisional wardens and about one hundred and fifty district wardens or patrolmen, and the total cost for patrol and fire-fighting amounted to about $175,000.

It being the first year of the establishment of the forest branch, not much was done in the way of slash burning, trail, telephone or lookout construction, but information necessary to the preparation of plans for such work was collected, and it is hoped that good progress will be made next year.

The funds for fire protection are obtained by levying a tax of one cent an acre on all timber lands in private ownership or under lease or license, an equal amount being paid into the fund from the general fund of the Province. In most of the timber lands paying this protection fund the government has a financial interest amounting to fifty cents per thousand when the timber is cut, so that both the timber owners and the government are equally interested in establishing a first-class fire patrol and fire-fighting system. Speaking for the government, I can say that the forest branch is anxious to have the heartiest co-operation and the vigorous support of the lumbermen in building up a corps of fire wardens and patrolmen qualified by experience, energy and character for this work, and, with their help, I believe we will be successful. (Applause.)

SAFEGUARDING LOGGING OPERATIONS

President Flewelling had announced that he would call the convention to order at exactly 1:30 o'clock if no one but himself were present. As a result of this threat, the delegates were in full attendance promptly at the afternoon session.

The topic under discussion, "Safeguarding Logging Operations," was opened by J. J. Donovan, of the Lake Whatcom Logging Company, Bellingham, Washington, who spoke without notes.

MR. DONOVAN'S ADDRESS.

Mr. President and Gentlemen: I shall first place the responsibility for the trouble that you and I are going to have for the next ten minutes where it belongs; it is right there with Mr. Allen. Two years ago I had the misfortune in the Logging Congress in Portland to suggest in some slight detail that there might be room for improvement in the administration of the Forest Service. I immediately offended Mr. Allen, and he swore that he would get even. He has gotten even with me, and incidentally is getting even with some of you who may be good friends of his, because I have come to know that I consider Mr. Allen about the most efficient man on that job in the United States.

Speaking of safeguarding logging operations, that is a pretty broad subject, and a few of the things I had in mind are covered in other lines that will be brought up later; therefore it seemed to me that probably I might speak for a few moments in regard to the camps, the danger to the camp, and the danger from the camp in regard to fire, a little in regard to machinery, and, finally, a word or two in regard to the men. As to the camp itself, you all have seen a great variety. I have in mind for one thing, the camp put in in a hurry with the dead trees cut away with the tops lying pretty close to the cook house and bunk house and brush near, and everything looking perfectly safe from fire, but I have also been around that camp when on account of the north wind on the Puget Sound country coming down unexpectedly in March, things suddenly dried out and every spark in the underbrush might make a blaze unless it was immediately attended to, and I have known under such circumstances not only the camp being burned up itself and the loss of life which was the case within fifteen miles of our own camp last May, but having started a fire that came into the forest and destroyed the forest around the camp. It is so easy when there is a demand for logs, when somebody is pushing for an output and when there is a fine belt of timber that you can draw upon, to put up a few hasty buildings and not remember these north winds, when it is a very serious and dangerous matter to dispose of this underbrush later, when if you had taken a little more time in the first place and cleared away, as should always be done, everything that is possibly combustible for a distance of at least three hundred feet from your buildings, you would be relieved not only of all danger to your camp and to the men therein, but to your forest in case a spark from a donkey engine or cook house should start a fire right there.

Now in regard to the machinery, there has been very great progress in the last few years. We haven't yet reached the point where there are electric hoists or donkey engines working in the woods except in one or two points, and I am still willing for my part to let the other fellow do the experimenting, although I hope there is someone here from Southern Oregon or Northern California, where I am told that class of machinery is working to perfection. I haven't seen it. I want to hear more about it. If you can have a central station and a wire running into the woods, instead of all these independent donkey engines, we would then have, as far as the donkey engine part of it is concerned, an ideal condition. You can have much better conditions in most cases than exists now. You can have on your donkey engine, if it is burning wood, something better than the old-fashioned screen, which the fireman is apt to punch a hole through when the cinlers get a little too strong, and you can in many places substitute oil for wood with an actual saving in cost of power. In that respect I would say that I have followed the middle course. During the past year we have put oil under four of our principal donkeys, and, whether it was due to that or some other cause, last year was the first year in the history of our company that we had absolutely no fire whatever in the woods in our fourteen years of experience. We still have the distant donkeys, which are away from the railroad, burning wood, but we have taken the exhaust out of t he stack and have some form of burner that enables the fireman to get a proper draft without resorting to the heroic measure I suggested a few moments ago. We do also during the dry season keep a watchman from the time the engine stops work for at least two hours, and sometimes all night, depending on the character of the wind and dryness of the country, to see to it that by on chance is there any fire starting from the donkey engine after work is done. Some of you may not think that is necessary, but we had in our case two or three experiences of fire starting hours after the work had ended and we felt that it was worth while.

In regards to oil burning, which is not new, but which some have not tried, I will say when we first put the oil under our first donkey it was with a good deal of feeling that it was an experiment, and possibly would not work out, but after two months of trial it was so satisfactory that, as I have said, we placed it under three more engines and any new engines we order will be oil burners. We feel that we are making money if we value the wood that goes into the boiler at anything what you value it when you get it to the place of sale. There is nominally a serious increase in your cost, because you save only about half in labor what you have to pay for the oil, but the other half and a good deal more is made up in the value of the logs.

Now, with regard to the men, the average logger is a pretty independent gentleman, and doesn't like to have too many rules. We issue to our men not a set of rules, but a little notice as to one or two things that govern the pay and deductions, which are few, but we do not undertake to give

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any printed instructions to govern their conduct. I don't know whether they would resent it or not, but I have an idea that we get about as good results by having the men understand when they get there that we don't expect any gambling in camp, we think the gentleman who likes whiskey should go to somewhere else, and if he can't, we don't want him any longer, and during the dry season that the pipes and cigarettes in the woods have to be cut out, and if they are not and the foreman finds it out, the gentleman goes down the road. Now, without trying to bear down hard with personal regulations on the men, those three things are thoroughly well understood by the two hundred men in our camps, and we have no trouble about them at all.

In going through my pigeonholes, where I keep matters relating to fire, after Mr. Allen had insisted that he was not going to let me away on this matter, I picked up various and sundry specimens of lurid literature, most of which Mr. Allen is responsible for, and some others such as are hung up on the door there, and really I felt quite pleased when I found that I had come ahead of Mr. Allen on lurid literature and put this out five years ago (indicating) and stuck it up all over our country. That is as near as we have come to telling the man what he must do; it amounts to this, we called attention to the law of Washington, at that time, and to the fact that a lot of things men thought they could do and nothing happen to them that was likely to get them in jail, simply quoted from the law, and that had a good effect. The feeling for the law up in our country now is very much more substantial than it was a few years ago in regard to those matters. The ranchers through our country used to think it was all right to set a fire at any time, regardless of whether they had a permit or not, and we had the unpleasant duty of calling it to the attention of some of the fire wardens in case of a rank violation, and it resulted in a half a dozen arrests, and while there was a little ill-will against us, there were no more fires without proper permit.

These suggestions I have made off-hand as to the camp and as to the men and as to the machinery, and may not meet with the approval of the majority of the gentlemen present, but at least they open the discussion, which is all Mr. Allen asked and all that you expected, and I will now give somebody else a chance. (Applause.)

DOUGLAS RODMAN'S ADDRESS.

Douglas Rodman, of the C. A. Smith Lumber & Manufacturing Co., Marshfield, Oregon, following Mr. Donovan under the association's customary plan of having each topic presented by two speakers representing different conditions, started a lively discussion by suggesting a set of definite camp rules regarding fire prevention. He said:

The protection of logging operations from fire is just as necessary as is insurance on a sawmill. You can insure a mill but you cannot insure timber. All you can do is to protect it.

When the need of protection, which is so obvious as to make its discussion here unnecessary, is fully realized, the first step has been taken.

This need is so great that it now seems poor policy to neglect any point which makes for better protection. This is due, of course, to the greatly increased value of the stumpage and logging equipment, to bigger operations and more intensive management.

The second step naturally involves means for protection. This would logically take one of two courses; either the present methods of logging would be changed, or else the existing methods would be made as nearly fireproof as possible.

Electric, instead of steam logging equipment, would eliminate the greatest elements of danger from fire. The C. A. Smith Lumber Co. has had under way for some time experiments with electric logging machinery. The danger of fire getting out from an electric donkey is practically none. And the cost of logging will be considerably reduced. But while there is every indication that electric logging is practical and economical, it is not yet beyond the experimental stage.

So in most logging operations the means of protection involves the handling of the usual steam equipment, in a manner that will reduce the fire risk to a minimum. The exceptions would be those operations where the local conditions make oil-burning machines practicable.

It is taken for granted that it is unnecessary to discuss here the urgent need for the equipment of donkeys with spark arresters, hose and fire-fighting tools. The need of this equipment has been proved so often and so conclusively that there can be no question of the importance of having it.

Slash burning, the falling of dead snags, and the clearing out of a fire line between the logging operations and the timber would, of course, be desirable.

But, however complete the fire equipment may be, and however much care may be taken to prevent fires, it is probable that fires will get out.

What are you going to do then? In some cases there has been confusion, with resultant delay, and a big fire. How can this confusion be avoided?

Since the need for fire protection, and the means for securing this protection are becoming generally recognized, this question seems vitally important: What are you going to do if a fire gets out?

In a sawmill there can be a fire drill which will train every man to know his place if a fire starts. We cannot go to this extent in the woods, but we can have better understanding, better organization and a better attitude towards the fire question.

The Attitude of the Owner Is Important.

When the men understand that the owner will not tolerate fires a step will be taken towards preventing them. For many fires that start some one is to blame. Maybe it is a donkey driver who has punched the screen full of holes to increase the draft. Possibly a section crew that has seen a cinder start a little fire and have not jumped on it.

And then again it may be a foreman who is taking chances in order to increase his output. If the men know, and have it proved to them if necessary, that the owner will not have a man on the works who is taking chances with fire, it will make them more careful.

Right often a foreman thinks he must get logs out no matter what happens, and sometimes the logging superintendent is responsible for this. Every one concerned should understand that the one exception to this rule is a fire.

Camp rules serve two purposes. One is to instruct the men what to do if a fire gets out, and the other what to do to prevent fires. Probably the rules which are very simple and very brief get the best results.

Two sets of rules, one for general use and the other for engines, might be used to advantage. The former would apply to fire-fighting, and the latter to fire protection.

Rules.

1. When you see a fire put it out.
2. If you can't put it out tell the hook tender or foreman.
3. Don't lose any time.
4. Five short blasts of the whistle mean there is a fire.
5. That means every man in camp is wanted excepting the cook and flunkies.
6. Contract men—fallers and buckers—must fight fire.
7. John Jones is a fire warden and in charge of fire fighting in this camp. Do what he tells you.

Engine Rules.

The following could be posted on the engine:

1. If a fire gets out from this engine, put it out.
2. If you cannot put it out blow five short blasts on your whistle.
3. This engine must be equipped with a spark arrester, 100 feet of hose, 6 shovels and six 5-gal. pails.
4. If it is not thus equipped, tell the foreman.
5. After it is equipped, keep it supplied.
6. Don't punch holes in the screen.
7. Wet down around your engine before going off shift and at noon.
8. John Jones is a fire warden and in charge of fire protection in this camp. Do what he tells you.

Organization.

In large operations where there are many camps, the man in charge of fire protection would prob-

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ably find it advantageous to have a man in each camp, or certainly in the camps where the greatest danger exists, to see that the engines are properly equipped, to keep them supplied, to watch out for fire and to take charge of fire fighting should a fire get out.

The authority of the man in charge of the fire situation, his relation to the foreman, and also the relation of the foreman to the camp fire warden should be thoroughly understood. Confusion in this connection might result in delay, and delay often results in a serious fire and considerable loss.

After the need for fire protection is realized, and the equipment for adequate protection is installed, the most serious aspect of the fire situation as I see it, is the mental attitude of the loggers. They accept fires as a matter of course. Sometimes they are glad to have a fire, for it clears out the brush and makes a better chance. Last summer the C. A. Smith interests had about six million feet of logs burned over in a logging camp. After it was all over I said to one of the loggers, "That was pretty bad," and he replied, "Yes, but look at the logging now!" It is this spirit which contributes very largely to the fire risk. Part of it is due to indifference and part because it is believed that fires can not be put out, and that when they start the best thing to do is to get them burned out as quickly as possible so that logging can be resumed.

Of course there is no reason to have fires just because we have had them in the past. The loggers have separate bunks, and shower baths now, but a few years ago they lived under very different conditions. And the fire situation can be just as much improved as the living conditions.

When a logger brings up the argument that fires can not be kept out, and clinches it by saying that fires have always occurred during the dry season, I am reminded sometimes in my efforts to prove that they can be prevented to a considerable extent, of the attitude of the farmer at the circus.

This farmer, as you may recall, paid his gate money and went into the circus tent. But he never saw the show, for he spent all his time before the giraffe. And he walked around and around the cage and never took his eyes off the animal. Finally the show was over, and they put him out. But as he went he took one last look and said: "Huh, there ain't no sich animal." Now that man was set in his ways. So are some loggers.

The improvement along this line—that is, changing the attitude of the loggers—must come through education, of course. The best way to educate is by demonstration. Therefore when a fire occurs it is a fine example to show the men that it can be put out. Many of them have believed for years that when a fire does start it must burn itself out. The way to prove the contrary is to put out a fire after it has obtained a good start.

No man can really want to fight fire, for it is the hardest possible work. So if the men understand that it is a sure fight if a fire does get out, they will be apt to be more careful about protection.

They will take a personal interest in keeping the engines properly equipped, and in jumping on a small fire should one get out. And when this is done a long step will be taken towards efficient fire protection.

Time and patience—lots of both—are necessary to accomplish this. Then through better equipment, better organization, better understanding, and a better spirit, the more important points of fire protection will have been covered. But when this has all been accomplished, the most important thing of all will still remain to be done. That is to keep everlastingly at the men in order to keep them up to the mark, so that when a fire does get out they will jump on it so hard and quick that there will be no need of any further action. (Applause.)

Discussion.

President Flewelling: We have 30 minutes to discuss this subject and I suggest particularly that every active logger tell us what he thinks should go into a set of camp rules to prevent fires.

T. J. Humbird, Humbird Lbr. Co., Sandpoint, Idaho: Rules such as have been suggested are undoubtedly necessary, but equally important are vigilant watchmen around all operations. Do not depend too much upon regular workmen to see fires or put them out. In railroad logging we find it particularly necessary to have a man whose sole duty is to watch for fires, at the noon hour and at night.

E. G. Griggs, St. Paul & Tacoma Lbr. Co., Tacoma: I think the introduction of oil fuel the most important thing to eliminate fire risk unless we find we can substitute coal for wood with equal safety. Our company has given oil a severe test and is now experimenting with coal because we are interested in a coal property. Unless necessary, it is not conservation to bring oil from California and waste our own resources. Nevertheless when I asked our foreman what he thought of oil, he said that while using it, it was the first time since working for us that he had been able to sleep without worrying about fire. All these discussions should be circulated among camp foremen, who have the real responsibility of keeping fire out of logging works.

E. S. Grammer, Brown's Bay Logging Co., Seattle: I instruct camp foremen to omit no precaution. They must have buckets at donkey engines, fire-fighting equipment at convenient points for the men to get it quickly, and enough patrolmen to patrol the entire camp night and day. The man in charge of the camp is held responsible and the patrolmen report to him regularly. Every man in camp has orders to leave whatever he is doing at any time to stop a fire. I wish this association would extend its work to conduct educational courses, something like Chautauquas, to reach all those who work or live in the woods as well as the proprietors and camp foremen who hear or read these discussions.

F. D. Markland, District Fire Warden, Vancouver, B. C.: My experience in British Columbia is that four out of five fires from donkey engines come from setting the engines too close to dead snags which get afire and scatter sparks.

President Flewelling: Do you suggest as a camp rule that donkeys must be kept away from snags or the snags cut?

Mr. Markland: I certainly do. No donkey should be within 200 feet of a dead snag.

Mr. John O'Brien, O'Brien Logging Co., Vancouver, B. C.: While most of my experience has been in a country where more time is used shovelling snow than in fighting fires, I have been in British Columbia six years and learned the necessity of such rules as we are discussing. My foremen are instructed to center their entire forces where there is a fire, calling them together by a whistle signal. We have from one to seven patrolmen out every night.

One evening last September when the men had quit work and were all at camp or on the way, a patrolman blew the fire signal at a donkey about sixty rods from camp and within three minutes fifty men were at work. In half an hour there were a hundred, and in fifteen minutes more a hundred and fifty. Even with this prompt action it took all night and all the next day to extinguish the fire. Now what I should like to know is how to keep fire from working you forty hours even when you see it start and can get your crew on the ground at once. It was a dry slashing and a cigarette. How stop the cigarette?

President Flewelling: What are your instructions on that point?

Mr. O'Brien: I can't give any. That's what I want to learn. I know of no remedy unless the law can protect us. I don't know how it is here in the states, but our British Columbia foresters have a law that we operators have to live up to. They compel us to have so many pails and picks and so many feet of hose at each engine.

President Flewelling: Don't you think that is good?

Mr. O'Brien: Certainly. I did it anyway, and I think the rules we have heard read are as near right as I could suggest.

E. T. Allen: Everybody seems to approve the instructions. Wouldn't it be a good plan if all operators were to take these papers and discussion as a basis and see that such rules are printed on cards and posted around their camps? We seem to depend on instructing camp foremen. Better

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have the instructions in several languages and prominently displayed so all the men will be reminded of them every day and have no excuse for ignoring them. And one point brought out by Mr. Rodman should be included; that is that everyone be impressed that the proprietor sets fire prevention above getting out logs. Too many foremen and workmen feel so responsible for keeping the logs moving that they take chances with fire. If the proprietors' attitude on this were printed over his signature it would have a wholesome effect.

Mr. Griggs: Why not boil this matter down through a committee and have the association publish a set of camp rules?

President Flewelling: The difficulty would be in making rules suited to differing localities. We have to leave such things to the several constituent associations to work out for their own conditions.

Mr. Griggs: I think it would help if a committee representing the different districts were to formulate something definite. I move that the chair appoint one.

Mr. Humbird: Why not have Mr. Allen take this up with the secretaries of the local associations? After each receives all the other's suggestions thus obtained, it can do what is necessary to get the best local application.

Mr Griggs: A good suggestion, but better have three practical loggers in each district pass on rules for that district first. Then let Mr. Allen boil this material down and pass it through the local secretaries.

F. A. Silcox, U. S. District Forester, Missoula, Mont.: Wouldn't it be possible for each operator to work out a simple fire plan for his own operations, including, for example, what clearings are required around his engines, and then include the general rules for his district?

The motion was put and carried and a little later the chair announced the following committee:

Douglas Rodman—Oregon.
E. G. Griggs—Washington.
E. T. Allen—Oregon.
T. J. Humbird—Idaho.
J. J. Donovan—Washington

SLASH DISPOSAL

The second topic discussed at the Monday afternoon session was slash disposal. E. O. Siecke, representing F. A. Elliott, State Forester of Oregon, presented the address of the latter.

MR. ELLIOTT'S ADDRESS.

Gentlemen: Slash burning has been a live issue for the past few years and bids fair to increase in interest to the entire Northwest in proportion to the increase in logging, land clearing and allied industries. To say that slashings, or the debris left from logging, wood-cutting, land trails, telephone, telegraph and power transmission lines, creates a very grave menace to standing timber and other property in the community, is only reiterating what has been said from time to time by the different writers and speakers on the subject, and what is a generally conceded fact by all who have given the matter any serious thought. Volumes could be written verifying these conclusions, based upon the actual experiences of settlers who have lost their homes, loggers who have lost their equipment, timber owners who have lost their timber and cases where even the loss of life itself can be traced to careless handling and to the lack of a systematic disposal of slashings.

Up to this point there seems to be no difference of opinion, but when we come to consider laws governing the slash disposal question, methods to be used, time of year for burning, etc., then it is that we begin to flounder and sidestep the issue on account of the diversity of opinion in a given locality, and the almost innumerable local conditions governing individual cases.

In Western Oregon we have the heavily timbered fir, spruce and hemlock districts, where the refuse after logging very often looks as though everything has simply been cut down and jumbled together in an inextricable mass of logs, limbs, tops, brush, etc. Under such conditions, nothing but a wholesale burning would be practical or even possible. In Southern and Eastern Oregon we have the lighter stands of pine timber, where after logging it is very often impossible to get anything like a good burn without piling or windrowing the brush.

We have a clause in the Oregon Forestry law providing that "all persons, firms or corporations engaged in logging or permitting logging on their lands, shall each year burn their annual slashings at such time and in such manner and with such help as will confine the fire to their own lands, and if such burning is done between June 1 and October 1, shall cut down all dead trees or snags over 25 feet high." This same section of the law also covers in a like manner the inflammable debris resulting from building of trails, roads or railroads in the state; while another section covers old slashings, windfalls, etc., likely to cause the spread of fire.

Now, assuming that every one is interested in the protection of property from forest fires, the question is: Just how far is the state justified in carrying out the letter of this law? We have a great deal of old slashing that has been allowed to accumulate for a number of years before this law was passed. Since then, climatic conditions have been very unfavorable for annual slash burning at a time when fires could be controlled at a reasonable expense to the owner. Our new law is considered as being on trial, and therefore we have so far been somewhat lenient and have relied more on the co-operation of those interested than upon a strict enforcement of the law. Whether this course has been a wise one will be shown by future developments.

Under our forestry laws it is not practicable, and in fact not permissible, for the state to step in and burn a slashing unless the owner refuses, or persistently neglects to do so. We have therefore only assisted in this work by furnishing our supervising wardens, who are selected very largely for their efficiency in this work, to take charge of slash burning whenever requested. These wardens are also instructed to insist on having slashings of all kinds burned whenever conditions are favorable, even though such burning was done during the closed season.

The Fall of 1911 was too wet to allow of any great amount of slash burning, and we made the mistake of urging slash burning last April and May before putting our supervising wardens in the field. The result was that burning of clashings, old fern and brush covered burns was done by inexperienced men without sufficient help to control the fires. When the very unusual hot, dry, east winds came up in May, a number of fires were allowed to escape, causing crown fires at a time in the year heretofore thought impossible. As a result, timber men who formerly were strong advocates of either Spring or Fall burning, are now advocating neither. The extremely dry weather during April and May, accompanied with east winds, and the very favorable weather through the entire closed season, June 1 to October 1, it seems to me, only makes it the more evident that we must be ready to meet conditions as they come up instead of having set rules that may be found impracticable, dangerous or impossible when most needed.

Unless the state has a sufficient appropriation so that a trained crew of men can be kept employed by the year to do this work, I am more than ever convinced that local organizations of timber and other land owners, rather than state officers, should handle the slash burning. They have a much better chance to familiarize themselves with local conditions, and have or should have local men on the ground at all times of the year to take advantage of weather conditions. In the course of time they would be able to get

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together an expert crew of field men to handle this work more effectively, with less expense and less likelihood of damage being done to surrounding property, and surely with less friction than if handled by the state. In Oregon, for instance, we have only $30,000 per year for handling all phases of forestry, and it is needless to say that our funds are entirely inadequate to do the slash burning, and very meager for even supervising it with the most hearty support and co-operation of all concerned.

Classes of Slash.

We have found that there are about as many different classes of slash as there are slashings to burn. They can, however, be classified under three general heads, as follows: (1) Slashings of the rancher in clearing his land; (2) the brush and tops remaining where the timber has been cut into cord wood; and (3) the debris left after logging.

The first class has probably given us the least trouble, since it usually consists of only a few acres with one or more sides bounded by cleared land, so that burning can be done when the wind is blowing toward this and away from the standing timber or brush land that might otherwise become ignited. Slashings of this character, when the work is done under the supervision of our wardens, are almost always burned without any extra expense to the owner other than the actual time spent in doing the work. If they are of such magnitude as to require assistance, this is usually furnished by neighbors who possibly have work of the same kind to do, and no actual outlay is necessary. A number of such slashings were burned the past year under the supervision of our wardens and at a minimum of expense, with no loss to property of any kind.

The second class (wood cutting) is always a hard proposition, as the wood is left on the land to be hauled out during the dryest part of the season, so that burning can't be done in the Spring of the year, and the wood is not removed in time to permit Fall burning. We are, moreover, at a great disadvantage in getting this class of burning done, in that it is the opinion of our attorney general that our law does not cover debris left after wood cutting, and therefore all we can do is to request such burning but cannot force it to be done. A 70-acre slash of this character was, however, burned last September by a crew of 15 men, while the wood was still piled on the land. This was done by first carefully burning around the wood piles and afterwards making a general firing. This work was done in about seven hours on land that was covered with an exceptionally heavy slash, with no damage to the wood, and left the land practically clean, with no danger of fire the following season, and with very little expense to the owner or to the state. Another similar burning was done on an 80-acre tract during a damp time in the latter part of May, showing that such slashings can be gotten rid of if only the owners can be persuaded to do it in a systematic way.

The great bulk of our slashing, of course, comes under the head of debris left after logging, and we have some of these that are also covered by wood-cutting since frequently the owner wishes to make cord wood of the tops, etc., left after logging. Where this is the case we have made very little headway in getting at a solution of the slash removal, and I am of the opinion that our law will have to be changed to meet this condition before any great amount of such work can be done.

The straight-out logging slash, however, is being handled, not with the intention of compelling people to live up to the letter of the law, but with the object in view of making it easier to comply with the law than to disobey it.

One of our supervising wardens, with the help of four men, burned a slashing of 320 acres in Western Oregon, on September 26 and 27. This was a very heavy slash, with green timber on the east and south, and logged over lands on the north and west. He first had all snags felled within 100 feet of the green timber, and burned this 100-foot strip against the wind; then on the second day, at 2 p. m., with a light breeze from the northwest, he set fire on the north and west sides, making a clean burn at a cost of 20 cents per acre and with no loss whatever.

Another warden in Eastern Oregon, with the assistance of three men, burned a heavy slashing on 80 acres that was bounded on three sides with timber and one side by a railroad. A fire line two rods wide on the sides next to the timber was first burned, and then the entire slash was fired against the wind. One man was kept on the fire line through the night to prevent any chance of fire backing into the timber. A good clean burn was obtained, and the cost was a little less than 25 cents per acre.

A warden in Southern Oregon, with the help of two men, burned a 125-acre slashing, with timber on one side and slashings containing logs on three sides. Fire was started along a narrow road between one of these slashings and the one to be burned, at 4 p. m., and a fire line burned some 50 feet wide. After this fire break was thoroughly burned, the main slash was fired against the wind and a clean burn made, with no damage, and at a cost of less than 15 cents per acre. The same warden burned 240 acres in the same manner, with the help of three men. This area was practically surrounded by timber, and a narrow strip was first burned around the slashing, which was afterwards fired from all sides. A good clean burn was secured here at a cost of 20 cents per acre.

Another warden, with the help of ten men, made a very complete and successful burning of a slashing of nearly two sections of land located on steep mountain sides. Stubs were cut down over a strip four rods wide, and this strip was burned first. Then fire was set on the upper side and allowed to burn down the hills for some distance, then set on the lower side so that the fires came together at a good distance from the standing timber. All the fires were set in the afternoon after wind had died down, and no difficulty was experienced in controlling them. This burning was done at a cost of about 20 cents per acre.

As the state had but one man in each county, the greatest trouble we have found is in being able to give the necessary assistance just at the right time to be able to get rid of the slashings that should be burned after the first Fall rains. If the timber owners could see the necessity of keeping their patrolmen on duty at this time to assist the state, it would greatly facilitate matters and help in a work that, to my mind, is of the greatest importance, not only to the state but to all land owners and settlers in the timbered districts. (Applause.)

G. C. Joy, of the Washington Forest Fire Association, followed the reading of Mr. Elliott's paper with the address of J. L. Bridge, who was unable to be present.

MR. BRIDGE'S ADDRESS.

Gentlemen: With the Washington Forest Fire Association, the history of slash burning during the last five years has been one of progress both as regards the amount of purposeful burning done annually and the methods pursued in doing the work to guard against damage to adjoining property. Five years ago the logger who made it his business to burn over his old works annually was the exception—today the case is the reverse and the up-to-date logger burns his slashing when favorable opportunity offers.

Our experience has also taught us that certain precautions can be taken which have proved effective in safe-guarding other property and, while we do not attempt to deny that the element of risk is usually present when forest material is fired, if the time of burning is wisely selected the attending risk is very small when compared to the greater hazard of attempting to carry an unburned slashing through the hot season. Between 75,000 and 100,000 acres of timber are annually cut in the forests of Washington and the debris left on the ground constitutes the most serious menace to timber which we are called upon to face. Can you imagine the conditions which would exist and the inevitable result which would follow if this waste material was left to accumulate for four or five years until some day an East wind comes unexpectedly, as it did last May, and carries fire broadcast. My observation has been that most

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slashings burn sooner or later and the fires generally occur in the hottest part of the season when control is most difficult and damage to green timber is most apt to result.

The question of burning does not appeal so much to the small logger working in small bunches of timber and making frequent moves from one locality to another, but it has come to be a vital problem with the large operator who locates in a body of timber for a period of years. The fire risk increases with the size of the slashing and it is consequently more important for the large operator to burn his slash periodically than the one logging smaller tracts. It is so manifestly evident that something must be done with these increasing slashing areas and that burning is the only practical method of reducing the fire risk, that the most serious question we are asked to solve is—when to burn and what precautions can be taken to control the fire.

Weather Conditions Govern.

Weather conditions must necessarily govern the time to burn. There is usually a time in the Spring when the risk of firing slashing is not serious. As early as last March we were able to burn slashings in a few localities where the material dried out quickly and a number of loggers succeeded in getting a fair burn at that time, but this is exceptional and as a rule no general burning can be done until April or May. Such opportunities do present themselves occasionally, however, and should not be overlooked. A good many slashings were burned last April and early in May and up to the 14th of the latter month there was no loss from such burning. As a rule, at this time of the year, there is sufficient moisture in the tops of the trees to stop the fire when it reaches green timber.

Beginning with the 10th of May, we experienced a period of unusually hot weather with the thermometer ranging around ninety degrees during the day. This was followed on the 14th day of that month by a strong East wind. A wind from this direction is exceptional, but when it does come it is much to be dreaded. It carries little moisture and in fact is so much feared that a number of companies have adopted the rule of suspending operations when it comes from this direction. This combination of conditions resulted in considerable damage being done at that time to green timber in five localities, besides causing other loss of camps and equipment and the lives of five employees.

While we regret such occurrences it is a risk which the logger must necessarily assume and in discussing this particular fire we must remember that it accomplished a great deal of good in Western Washington in a general burning of slashings at that time and the fire risk from this source was greatly reduced. About 400,000,000 feet of green standing timber was killed within the space of a few hours. The worst fire was North of the Skagit River in the vicinity of Hamilton where approximately 250,000,000 feet of timber was killed. This timber stood on a South slope with heavy slashings between it and the bottom of the valley and by the time the fire had burned across this large area of slash it had developed such a terrific heat when it reached the green timber that nothing could stop it. In a number of cases which I might mention the burning done by loggers previous to the 14th of May without doubt prevented damage to timber and equipment near their camps. A very small percentage of this 400,000,000 feet of timber was actually destroyed and with the exception of one locality it is all near transportation and consequently the actual loss will be comparatively light if it is cut and marketed within the next four or five years. I understand that arrangements have already been perfected for marketing about three-quarters of the timber killed at that time.

Fires which kill timber almost invariably originate from some accidental fire in a slashing where logging operations have been or are being conducted. This means that transportation is available and the question of salvage by cutting and marketing the fire killed timber before any great depreciation takes place is an easy one to solve.

In the five localities where timber was killed last Spring, a good many stubs were left burning in the timber area. In conjunction with the State we immediately put men in this timber to patrol and locate all of these burning stubs and they were cut down and the fires extinguished. The weather during the succeeding three months was ideal and no large slashing fires occured.

Maps of Districts Furnished.

We have made it a practice of furnishing our rangers with maps of their districts, showing in one color the timber represented in the association and during their spare time they were employed in looking up possible trespass in connection with their other work. I think this is a feature of our patrol work which can be enlarged upon with benefit to our members. We discovered a number of cases of trespass and assisted the owners in collecting what was due them on this account. Our men were also engaged through the Summer in issuing burning permits to various people living in their respective districts and wishing to clear up their land. Our rangers issued something over 2,900 such permits and in no case was there any loss.

It is very seldom that we experience such conditions as existed on the 14th day of last May and because an East wind carried fire broadcast at that time causing some loss under such circumstances, is no reason why we should stop purposeful burning at that season of the year. In my opinion the greatest danger of firing slashing in the Spring is from smoldering fires left to burn until the hot season arrives when they may spread to larger areas. There may be some old growth timber near your slashing with more or less defect and occasionally dead stubs. The fire may possibly get into some of these and unless sufficient rain comes to extinguish these fires the trees should be cut down and the fire put out or they will prove a continual menace through the Summer. It may cost a little money to do this, but safety cannot be absolutely assured without it and I would recommend a careful examination of timber near the burn before the hot weather arrives, to be certain that no such fires are left.

Personally I believe that slashings can be burned over in Spring or Fall with little danger of loss or damage when weather conditions are favorable and the fire properly handled, but I think Fall burning is preferable. My opinion in this matter was further confirmed last September. Conditions, especially during the latter half of that month, were ideal for burning and there was sufficient moisture in the tree tops to stop the fire at the line of green timber and enough in the soil to prevent a hot fire from injuring it. The good opportunity offered us at that time and the general burning done by loggers all over Western Washington was sufficient evidence of their belief in this method of fire protection. We had dismissed the majority of our rangers the last of August, as there seemed to be no further need of rigid patrol and we had only about twenty-five men on duty during this period of favorable weather conditions in September, but results obtained were most satisfactory. It was the most favorable period for doing such work that we have seen for some time and over 17,500 acres of slash were burned during that month.

When you remember that we devoted our principal efforts to the worst risks you can get an idea of the benefit derived from such work properly conducted. Areas varying in size from ten to several hundred acres were burned and there was no loss from such burning except in one case. In this instance we were preparing to burn the adjoining slashings of two logging companies and one foreman had been given specific instructions not to set fire until we had thrown up safe-guards on the opposite side of the slashing and until he received word from us to burn. Before we had completed our work and back-fired from the trench which we were digging, the foreman on the other side of the slashing, ignoring our instructions, set fire to his works about three o'clock in the afternoon and the fire rushed across toward where our men were digging this trench. They had no time to back-fire and the fire jumped the ditch and got

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in among some cut logs, resulting in some of them being burned on the ends. Such work on the part of this foreman was inexcusable and cannot be charged up to properly handled slash burning. This was the only loss resulting from our slash burning campaign in September, and was not a large one.

Common Sense Necessary.

In speaking of the methods to be employed in doing such work, some previous experience and a reasonable amount of common sense are practically the only necessary qualifications. We have found that a little urging of the foreman, at the right time, is sometimes necessary to get the work started. Most of them realize that a good burn is an excellent thing, but hesitate to assume the responsibility of firing the slashing themselves. It is an easy thing for us to come into this room and say what should be done, but when you start out with a box of matches in your pocket to fire a slashing there is very apt to be a queer feeling run up your backbone about the time you are ready to set fire, when you think of possible consequences if the work is not properly done. Each slashing is a problem in itself—we cannot lay down any rules which would apply to all. In deciding on proper methods to pursue, we must take into consideration the area to be burned, general topography of the country, direction of prevailing winds, condition of the slash and conditions surrounding any adjoining property which the fire may reach. For example—it might be advisable to take more than ordinary precautions to keep fire out of a body of old growth timber when it would not be necessary to do anything if the timber was second growth.

The Washington Forest Fire Association has a number of men in its employ who have done considerable slash burning and they are always glad to assist operators in every way possible in their efforts along this line. In fact, this is their particular business. And right here let me say a good word for the "men behind the guns." We do not claim that every man in our employ is without fault or that he is always the ideal man for the job, but I know better than anyone else that they are faithful and loyal and you will find that the right treatment will bring forth their best efforts. I am glad to say that conditions have changed in the last five or six years and that the rangers are now universally welcomed in the camps where a few years ago they were looked on as something of a nuisance. The up-to-date operator realizes his risk and is glad to have his attention called to defects in his equipment which might be the means of starting a fire and to precautions which he may take to avoid such trouble.

I have one recommendation to make in connection with this matter under discussion and that is that logging operators should shape their cutting, if possible, so that fire could be set out in their works without its running into a lot of cut logs at such times when we are likely to get a period of favorable weather. Experience has taught us the wisdom of burning slashings when the right time comes and a little foresight and preparation may be the direct means of saving a considerable loss. Logging operations are gradually working back into higher and rougher country where fire risk is greater and it consequently behooves us to take greater precautions to prevent fires getting started in slashings at the wrong time. (Applause.)

Discussion.

A. F. Wilbur, of the St. Paul & Tacoma Lumber Co., Tacoma, Wash., stated that the danger of fire was not so much from recent slashings as it was from old slashings burned over and grown up with underbrush and blackberry vines He had burned slash both in Spring and Fall with good success. The hottest fires he had experienced came from the growth subsequent to logging operations and slash burning.

W. J. Ross, of the Coeur d'Alene Timber Protective Association, of Clarkia, Idaho, said that in his district most of the burning was done either in the Spring or Fall and this was found satisfactory. No difficulty was experienced at that time.

C. S. Chapman, of the Oregon Forest Fire Association, said the main thing is to burn as frequently as practicable and in this way keep down accumulations that are hard to handle. If every fall, and from then on until early summer, everyone would take advantage of all opportunities to burn safely, the slashing area would never reach a dangerous extent. Our bad cases are usually where there has been no burning for a long time. One large operator in Oregon even believes that, except perhaps in very dry times, burning should be done once a week.

RAILROAD CO-OPERATION

M. J. Buckley, Assistant General Manager of the O.-W. R. & N. Co., Portland, opened the subject of railroad co-operation with the following address:

MR. BUCKLEY'S ADDRESS.

Gentlemen: At Portland last year, President Flewelling said in effect, "That the association was getting very close to the railroad; they respect us and we respect them; by working together we will have no difficulty." In view of the fact that we were very close together a year ago and that during the past year we have been working still more closely together, and the further fact that a large number of railroad representatives are in attendance and very much interested in this meeting, I feel perfectly safe in saying that co-operation between the Western Forestry and Conservation Association and the railroads has been accomplished, and now it only remains for both parties to make use of this co-operation to the fullest extent. The railroads are ready and willing to do their part.

At the meeting last year there was some question as to the proper railroad official to address regarding matters pertaining to forest fires. I would suggest you address the General Manager and by so doing the matter in question will be handled with least delay.

Regarding freight and passenger traffic, I can only say the railroads realize and appreciate to the fullest extent the many ways in which their revenues may be increased or decreased, both freight and passenger, by gain or loss in the lumber business; consequently railroads are very much interested in the matter of destruction nf timber by forest fires. Our traffic departments are ready to co-operate with you in publicity work, regarding the necessity and manner of protecting against forest fires, also in the matter of distributing and posting notices, circulars, etc.

In regard to improvements in spark arresting devices, there has been no improvement. Wire nettings or perforated steel plates continue to give the best results. Luring the dry season special attention is given the matter of inspection and repairs to stack and ash pan nettings. Enginemen while on the line between inspection and repair point are instructed to watch for an unusual amount of sparks, the result of a netting failure, after leaving inspection points, and in case of failure exercise whatever precautions are necessary for full protection against setting dangerous fires, also have trainmen watch for fires and if necessary stop trains and put fires out. Some persons believe nettings are in some way opened up or holes punched in them in order to permit engine to steam better. There is no way to open up a netting except to knock a hole; if enginemen should do such a thing on the road they would be subjected to severe penalty, particularly in case of fire resulting from such action. The matter of repairs and change of nettings is entirely within the jurisdiction of roundhouse or shop foreman. On some lines, on account of the quality of coal used, fire nettings are used during the extremely dry months and which does not permit the engines to steam freely, and as a result more coal is used and trains also lose time, but we put up with these conditions temporarily in order to reduce the fire risk to a minimum. It cost the O.-W. R. & N. Co. about $5000 per year to make these changes in nettings.

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It is understood, of course, that it is impossible to operate a locomotive without some means of getting rid of sparks, and nettings in perforated plates are as yet the best method of retaining the sparks to fullest extent, and yet permit the fire to make sufficient steam. The use of compound engines and superheated engines which burn less coal than ordinary engines to help out the situation to the extent that the less amount of coal used the less liability of fire.

In regard to use of oil for fuel in steam locomotives. This is a matter that must be considered by the individual roads from a cost and efficiency standpoint. If a road has coal mines along its line, it would naturally burn coal, for the same reason a logging engine burns wood in preference to oil. The development of our coal industry must also be considered. I notice in statements and reports made from time to time that railroads are generally at the head of the list of number of fires set, from which it may be inferred from the large number of fires that the same are result of neglect, carelessness or indifference on the part of the railroad company. I would like to ask what constitutes a fire and where it must be set so far as these reports are concerned. I assume if a fire is set on railroad right of way it has been reported as a fire, yet only a few feet of grass is burned. Railroads are doing business night and day and in the natural order of things are liable to set fires on the right of way. I do not think railroads should be charged with any fires that are confined to its own right of way. In my opinion we are not taking any unnecessary or unwarranted risks in the use of coal for fuel on steam locomotives. You understand railroads are constantly subjected to the liability of setting fire to wheat fields, hay lands, buildings of all kinds, etc., in addition to forest fires, and under such conditions it is only natural that we should adopt all the rea sonable precautions possible to protect us against these risks, and in doing so the use of coal for fuel in locomotives has been fully considerel.

In regard to clearing right of way, it is our desire that it be clearel once each year, but the scarcity of labor at times will not always permit this to be done. We are constantly after it, giving particular attention to places which we consider the most dangerous. We are also making progress in removing fallen and standing timber from the right of way. The liability of fire being communicated directly from locomotives to standing timber is being gradually diminished owing to the fact that the timber nearest the railroad is generally logged off first. During the fiscal year, 1911-12, the O.-W. R. & N. paid $49,444.98 for clearing track and right of way of weeds, grass, brush and timber.

Regarding instructions to train crews and other employees, all officers and employees are instructed to give the matter of forest fires special attention and to report same promptly and also render all assistance possible. Papers were read at the last meeting explaining in detail assistance railroad companies rendered in the way of assistance from track men, bridge men, signal maintainers, track walkers, trainmen, special fire watchmen anl other employees, also in the matter of plowing fire guards, inside and outsile the right of way. You are also undoubtedly personally familiar with what is being done in these respects, and it is therefore unnecessary for me to go into detail. During the past season the O.-W. R. & N. Co. paid $2475.36 for special watchmen on account of fires, and $7928.01 for plowing fire guards on and off the right of way and for damage to grain plowed up for fire guard. Most of this fire guard expense was in connection with wheat fields. Regarding systematic agreement, I do not consider they are entirely practicable. I note some railroads have signed them, but they contain conditions which are burdensome. I believe each locality should be considered in itself, and should take up with the railroad involved and make whatever arrangements that are necessary for protection. What would answer in one place would not be sufficient or necessary in another place; furthermore, in view of the co-operation of the railroads, I do not consider any agreement is necessary. Let us get together good and strong and constantly regarding these matters and I am sure we will get results; in fact, in so doing I believe will be a positive guarantee against forest fires set by railroad locomotives. (Applause.)

T. J. Humbird, of the Clearwater Timber Protective Association, responded to Mr. Buckley from the timber owner's viewpoint.

MR. HUMBIRD'S ADDRESS.

The question given me to discuss is the matter of Railroad Co-operation. In order that we may simplify the question, it might be well to classify it into three sub-topics.

Let us first discuss the mechanical operating problems as topic one.

As topic two, let us consider the question from a standpoint of freight, passenger and legal departments.

Third, let us consider the proper officials in the railway organization with whom to deal, and the method of presenting the question to these officials in order that it may appeal to them.

We take as an example the experience of the Pend d'Oreille Timber Protective Association, covering a territory traversed by the Great Northern, Northern Pacific, Spokane International and Idaho & Washington Northern railroads. For the three years past, I give you the number of fires for each year with the causes so far as shown and reported by the association. They are as follows:

146 Fires During the Year 1910.

57	fires	caused by railroads
7	"	from farmers clearing
53	"	causes unknown
1	"	caused by sawmill
2	"	incendiary origin
11	"	caused by camp fires
5	"	caused by smoking
2	"	caused by Spring burning of brush
6	"	caused by sparks from logging engines
1	"	set by insane man
1	"	caused by friction of logs in slide.
146	fires.	

120 Fires During the Year 1911.

46	fires	caused by sparks from locomotives and logging engines
3	"	caused by sparks from other fires
24	"	unknown origin
6	"	believed to be incendiary
9	"	ranchers burning without permits
7	"	caused by smoking
7	"	caused by lightning
5	"	caused by Spring burning
1	"	caused by mischievous boy
9	"	caused by campers and berry pickers
2	"	caused by men doing county road work
1	"	caused by careless workmen
120	fires.	

8 Fires During the Year 1912.

3	fires	caused by careless workmen
1	"	caused by campers
2	"	of unknown origin
1	"	caused by lightning
1	"	caused by sparks from locomotives
8	fires.	

Please note the proportion of fires attributed to railroads. The year just past we have been particularly fortunate in preventing fires, largely due to weather conditions, partly due to more care on the part of the railroads and added watchfulness of patrolmen. The major. portion of the credit, however, is due to weather conditions.

We have endeavored to prevail upon the railroads to inspect their spark arresters more carefully and more frequently; to prevail upon engineers and firemen to use more care in dumping of ashes containing hot coals; to require trainmen to report promptly all fires discovered to the nearest agent; to instruct agents to use all diligence in getting section men on the ground where fires occur, and if in need of further assistance to communicate with the superintendent without delay. Condition of right-of-way we have asked to be improved.

Two requests not mentioned above, vital in importance, are the burning of oil on engines through timbered districts, and the patrolling of tracks during the dry season by railway men

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whose special duty shall be the putting out of fires set by the railways before they have gotten beyond the stage of incipiency. The last two mentioned are perhaps the most important measures. There is the same reason for maintaining this patrol on the part of railroads that there is for the maintenance of a fire department in our cities, and there is every reason for close working relations between the railways and the timber protective associations and State and Federal officials. Much might be said covering this.

Let us pass on to the second sub-topic, the interest and influence of freight, passenger and legal departments. First let us consider the question from the point of the freight department. We take as an example the burning of 40 acres of timber land through fires set by railway operations. Assuming that the 40 acres has on it a million feet of timber; estimating the lumber to be produced, including low grade lumber for which no scale would be allowed but on which freight to the railroad would have to be paid, as 1,250,000 feet of lumber, weighing 2,000 pounds to the thousand feet. This gives us 2,500,000 pounds. Add to this the tonnage of posts, poles and piling, together with cord wood, say 500,000 pounds. We have a total of three million pounds of tonnage that we will assume has been destroyed by fire. This tonnage lies at the doors of the railroads, and requires no expense for solicitation for shipment. If burnt, this tonnage, or a portion of it at least, is forever lost. Assuming that the land on which this timber stood will remain in an unproductive condition for 10 years, at the end of which time it will begin to produce wheat. Allowing an average of 20 bushels per acre per year; figure out how many years of constant cropping at 20 bushels per acre will be required to produce the tonnage destroyed, then add to this the 10 years that the burnt land will lie dormant before being put into crop, and we have a very startling result. This will appeal to the traffic department.

To the operating department it has little interest. The operating department deals little with posterity. Cost of operation per ton per mile for the current year is little affected by a fire such as this. Our appeal to the operating department must be made on other grounds. This appeal must be on the grounds that it is cheaper for the operating department to patrol the tracks and prevent the fire than to lend aid in extinguishing the fires after they have assumed considerable proportion. Three years ago the aid given by one of our railroads in putting out one big fire set by them cost the operating department of that railroad several times what it would have to have prevented all fires during the season by patrolling of tracks and taking other measures suggested. These charges went to the operating department and increased their cost of operation. Prove to the operating department that the statements just mentioned are true, and we will secure their co-operation. Remember, however, that they are busy men, and it must be made plain to them, and we must be insistent in our demands.

The legal department of the railroad must be appealed to from the point of damage to be awarded by the courts because of carelessness, and the ability of the timber owner and the protective association to prove beyond reasonable doubt the want of care and the responsibility of the railroad for the fire. Because of the attitude of courts in recent years, the legal department will co-operate with us if properly approached, and they will lend their influence in prevailing upon the operating department to use all reasonable means to prevent fires.

The executive heads of any of our railroads, if the matter is properly placed before them, will be found willing to do everything possible to bring about co-operation between the different departments of the railroad and the fire associations. It simply means after the condition has been set forth with its proper remedy, that the attention of the executive head must be gained and he be impressed with the importance of the question. In this way, each year sees an improvement in conditions and closer co-operation. Many times failure to obtain results may be attributed to two things; failure to present the question properly and impress its importance upon the railways; and taking the matter up with the wrong officials. I have in the past five years on several different occasions discussed the question with the heads of the different railways, and at all times have found them willing to give me a hearing, and to show their appreciation of the importance of preventing fires by giving instructions to subordinates that would tend to lessen the danger. Each year requires the laying out of new program and seeking anew the co-operation of the railroads in the carrying out of this program before the dry season approaches.

We should strive to secure from the different railroads an agreement to burn oil, at least during the dry season, on all locomotives; to organize a fire patrol department, whose business it should be to patrol the tracks frequently during the night and day in order that fires set by trains might be extinguished. We should prevail upon the railways to give more rigid instructions compelling the reporting of all fires discovered by trainmen. We should impress upon the railways the needs of keeping their right-of-way clean and of using all other possible means to prevent fires. This can best be done by showing them that by so doing they avoid expense in the operating department caused by labor required to extinguish fires when once started; they avoid damage suits growing out of timber destroyed, and cultivate the good will of those living along their line. The last mentioned is getting increased recognition every day. If we can impress the importance of the above upon the railroads, I believe that their co-operation can be secured. (Applause.)

Discussion.

President Flewelling: A railroad is a railroad and we must not discriminate. I should like to hear from those who operate logging roads how they carry on their business; whether better than the common carriers or not. What is Mr. Humbird doing?

Mr. Humbird: We have two locomotives. We burn coal. It has been impossible to install oil as yet. (Laughter.) However, we use a better spark arrester than the transcontinental roads use. Furthermore we patrol our tracks very carefully.

Mr. Donovan: We have four locomotives. Until recently two burned oil and two burned coal. We are now changing a coal-burner to oil. In two years we have had no fires with the oil burners and did not patrol them. Before using oil we had to. Watch any locomotive on a grade of one per cent or heavier burning wood, lignite or bituminous coal and you see a very good imitation of a volcano. The wonder is that railroads are not charged with 75 per cent of our fires.

The time when most roads change to oil depends on the balance sheet. The average operating official has to answer to his directors. We have to come to a comparison of the cost of patrol, damage suits, etc., plus the cost of coal, with the cost of oil with these extra charges left out. On our road we find that with good coal costing $3.50 a ton, and oil at 75 cents a barrel, plus 15 cents for delivery; the latter costs as little more than half as much for the same number of train miles and tons hauled. Certainly all our work taken together can be done with oil at 90 cents a barrel for two-thirds what it cost with coal $3.50 a ton. And the way oil is handled nowadays does away with the earlier boiler troubles.

General Superintendent W. D. Scott, of the Great Northern: I agree with Mr. Donovan and with regard to fires can say he has not been bothered by Great Northern engines since we equipped with oil burners. We also try to keep our right-of-way clean.

Superintendent W. C. Albee, Northern Pacific: The old saying is that nothing succeeds like success, and nothing co-operates like co-operation. For two or three years we have kept in close touch with your associations and with the foresters and fire wardens. We conduct a campaign every year. In April or May I call a meeting of roadmasters, master mechanic and road foremen, and we all go down to Olympia to meet State Forester Welty and Mr. Bridge and thresh these matters out in a way that is an object lesson to our subordinate

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officials. They talk it to their men all down the line.

With regard to oil fuel, if I were to promise that the Northern Pacific will abandon coal, I would be in about the same position as though I were to tell you we would abandon lumber. We have many coal mines on our lines and have encouraged the industry. We have to recognize such obligations to the public. In this matter of oil versus coal we will probably have to continue a policy of not letting our right hand know what the left hand does, and in the meantime try to strike a balance.

During the dry season we maintain track patrolmen whose sole duty is to look out for fires. They can call assistance from all employees in the vicinity. Train crews are instructed to stop and extinguish fires when seen. All employees are to report fires and co-operate with the forest authorities to the fullest extent.

As to the proper railroad officials with whom you can most effectively take up fire problems, I agree with Mr. Buckley that the general manager is the one in matters of general instructions, but in local matters red tape should not stand in the way of dealing with section foremen, roadmaster, superintendent, or anyone else, in order to get as prompt action as possible.

Mr. Allen: Can you tell us anything about your spark arrester experiments?

Mr. Albee: We haven't found any special form entirely satisfactory for all kinds of coal except the old style of perforated plate or netting and we have to use the proper mesh to enable using bituminous.

President Flewelling: I will call on Mr. R. D. Prettie of the Canadian Pacific.

Mr. Prettie: We have an order from our Dominion board of railway commissioners requiring us to keep our right of way absolutely clear of combustible matter. Can anybody do that? We can't. It means making a desert of the right of way. If we get into court and have to prove our right of way was absolutely clean of combustible material in order to defend ourselves, you can see where we get off.

We are burning oil from Field to Calgary and from Kamloops to Vancouver, an aggregate distance about equal to that from Seattle to Helena. We post fire notices in stations and are beginning to put similar material in timetables. I think railroads are about as far advanced in fire protection as anyone. If Mr. Humbird has a more efficient spark arrester, I know our locomotive department will want to see it. I don't know what your laws relating to railroads are, but I think some of ours are unfortunate and should like to hear what you think of our requirement to keep rights of way absolutely clean.

Mr. Buckley: I would like to reply to the proposition of Mr. Humbird and Mr. Donovan that railroads burn oil in the dry season if not at other times. I am afraid they did not reflect that this would mean converting about 200 engines on each transcontinental line to oil burners and then back again every few months. In the first place it couldn't be done so quickly, and again it would probably cost $2000 an engine. I don't feel like letting them get away so strong on a suggestion of that kind.

Mr. Allen: Possibly the railroad people could help us with suggestions for reaching the traveling public; new ideas like our old ones for material in folders, cards telling smokers not to throw fire out of car windows, etc. I should like to hear from Supt. D. W. Campbell, of the Southern Pacific.

Mr. Campbell: All lines under my supervision burn oil, but still we patrol and use every precaution against fire from any source. Our bridge watchmen keep in touch with the forestry people. They have free use of the telegraph service and can keep in touch with other railroads' men. We post notices prohibiting throwing cigar stumps on the right of way. We co-operate with the forest service and hope to continue.

President Flewelling: I don't think I would be doing justice if I did not report on the St. Joe and Panama, my railway, that starts at our mill and runs four and a half miles south toward Panama. This year we have run neither freight nor passenger trains. Business is too poor. We don't burn anything.

Here Mr. Allen read the following letter from Division Superintendent W. R. Smith, of the Great Northern, whose headquarters are at Whitefish, Mont.:

"One of the most valuable fire-fighting arrangements we have in effect is that every engine, both passenger and freight, and including switch engines, is equipped with from 50 to 150 feet of one-inch hose and some with one and one-half inch hose. This can be attached to the injector pipe of the locomotive and the injector gives sufficient force to throw a stream of water from the boiler a distance from one to three hundred feet. With this arrangement we can throw water over our highest buildings and practically to any points within our right of way. Should a fire start in the timber along the track, the engineer of the first locomotive passing attaches the hose and puts it out. With our eight thousand gallon engine tenders, there is a good reserve of water to be used in this matter.

"We put in effect early in the spring a new conical cone in the smoke arch of locomotives, which effectively prevents any live sparks thrown from the stack without first having to pass through the fine network which comprises the cone, the size of the mesh being three-eighths of an inch. These we have found to be very valuable.

"In Canada, where my division has some seventy miles of track, we have established gasoline speeder patrolmen who carry collapsible water buckets, mattocks, axes and long-handled shovels. These patrolmen follow thirty minutes behind our freight and passenger trains and the fact that we have suffered no fire losses this year goes to prove that this system, while a little expensive on the company, has proven its worth.

"Again, the Forestry Department Rangers are given gasoline speeder permits. These Rangers patrol our track in the Kootenai, Blackfoot and Lewis & Clark forests. They are furnished access to the telegraph and telephone booths to report any fires to section crews and trackmen. Dispatchers, on receiving advice of any fire, immediately send men to put it out. Enginemen locating fires in the forest and not on the right of way, make report and the matter is immediately taken up with the Forestry Department. Permits are given its men to ride on freight trains in order to facilitate their movement.

"This year our company permitted me to expend $3000 clearing the right of way of combustible matter such as dry grass, dead trees, etc., and I expect to get a larger grant for next year which will clear the entire right of way of the Great Northern through the fire district. The most hearty and free co-operation exists between the Forestry Department and myself, my subordinate officers, and employees in all departments, towards taking prompt action to the putting out of any fires whether in the forest reserve or on the company's property, and no call from the Forestry Department is unheeded."

Following Mr. Smith's letter, Mr. Allen also read some correspondence with the Standard Oil Co., based on a newspaper report that it was to curtail the sale of fuel oil. He said that, since if this were true it would affect the whole movement for oil fuel as a fire preventive, he had written 26 Broadway for verification. That office replied that the recent dissolving order of the Supreme Court left it no authority to speak for the local companies and referred him to the Standard Oil Co. of California. The latter advised him that the reports mentioned "have no reference or application whatever to the future policy of the Standard Oil Co. (California) in its relation to the fuel oil business on the Pacific Coast.

"During the year 1913 our refineries alone will turn out for marketing at least 44,000 barrels of fuel oil a day and we now have in storage in California over 22,000,000 barrels of fuel oil."

Mr. Humbird: We have heard today that some transcontinental railroads do burn oil on the Coast. Then why not in Idaho? The Milwaukee uses oil throughout the entire timber district. If good for

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the Milwaukee, why not for the O. R. & N. and Northern Pacific?

I am not fighting the railroads. I own railroad stock. Nothing I say is personal. But we are here to co-operate, to work for the common good, and I think if we can show the railroads that it is of mutual advantage they will do all we ask. They are reasonable when you get next to them. But I would like to know why, if it is good to burn oil on the Coast, it is not good in Idaho. Mr. Allen tells us of a Montana division that follows its trains with speeder patrols. It seems to me Washington gets the good end of the oil project and Montana of the speeders, while Idaho don't get any of these good things. I would like to get a little.

D. Roy Cameron, Dominion Forest Service: The Great Northern put those speeders in the Canadian portion of the division because the Board of Railway Commissioners ordered it, but not in the states because it don't have to.

President Flewelling (who was out of the room during the previous discussion of conversion costs): I have heard it only costs $75 to convert an oil burner to a coal burner, or the reverse, and suggest to some of my railroad friends who must use coal to some extent that perhaps they can use oil in the dry season and reconvert to coal later.

Mr. Scott: I should like to be quoted such figures on conversion from coal to oil.

President Flewelling: Oh, I don't guarantee anything.

A Delegate: The tanks cost $600 apiece, but can be used again next season.

A Delegate: But you still have to reconvert.

Mr. Albee: Oh, you've got it all mixed up. You're talking about what it costs to convert a lumberman, not a locomotive. (Laughter.)

President Flewelling: Then will someone tell me what it costs to convert a railroad man? But seriously, I don't much believe in converting anyone by law. We should be governed less by law and more by common sense. Railroads as well as lumbermen are big enough to get together without force being used on either side. It was asked why railroads do not burn oil in Idaho as well as on the Coast. The reason is obvious: it costs money to haul it. It costs 75 cents a barrel on the Coast and about $1.25 to get it to Idaho.

Mr. Humbird: The Milwaukee does it.

Mr. Albee: I agree with President Flewelling. You cannot legislate the Roslyn mines out of commission or change natural conditions. If we can only understand each other and arrive at harmony in these matters, it will work out for the best without drastic legal requirements.

Mr. Buckley: On behalf of the O.-W. R. & N. I can say we don't burn oil in Idaho because of the expense. We do use it from Portland eastward 187 miles, which is about as far as we can haul it. I understand the Milwaukee owns no coal. I don't know what other reason is theirs, but ours is economy in operation.

E. O. Hawksett, Panhandle Lbr. Co., Spirit Lake, Idaho: Our line, the Idaho, Washington & Northern, operates over 100 miles of road. We converted to oil more than two years ago and can give a fine account. Considering the saving of labor, the cost of oil even after paying freight is no more than that of coal. Some Idaho logging companies have changed to oil with the same result.

Mr. Humbird: I have been hoping someone would tell the real reason why railroads use oil on the Coast and coal in Idaho. It is that damage suits for destroyed timber have been heavier on the Coast. It is more generally the policy to go after the fellow who burns it. I appreciate all the difficulties and costs, and certainly speak without animus. But taking all things together—injury to property, loss of lumber traffic, damage suits, etc., as well as mere fuel costs—I do not believe it is better economy to burn coal than oil. I can't believe it.

COMMITTEES.

The above railroad discussion closing the first day's business session, the conference adjourned after appointment by the chair of committees upon nominations, railroad co-operation, legislation, and general resolutions.

TRAIL AND TELEPHONE BUILDING

Tuesday morning the seats in the Convention Hall was well filled when President Flewelling called the meeting to order at ten o'clock.

W. E. Herring, of the U. S. Forest Service, led the discussion by the following address:

MR. HERRING'S ADDRESS.

Gentlemen: The first essential in either trail or telephone construction is system. Without it, work is lost, duplicated, and at the critical time it is found that some minor point has been overlooked which has a most vital bearing on the protection of the forests.

In the construction of trails, there are many points to be considered before any work is undertaken. First, the country which it is desired to protect should be well known, and a system of communication outlined for the entire district. Two classes of trails should then be considered: First, the more important or trunk trails, over which there will be a great deal of travel, and over which men and material would be transported in case of fire; second, are those less important trails used primarily as lookout trails but which may be used, in case of emergency, for transporting supplies and in many cases as fire lines.

The most essential feature is the proper location of the trail. The grade should not, as a general rule, exceed 10 per cent, and the trail should never be located from the bottom of a hill towards the top, but always from the top down. This is primarily for the reason that there is usually a pass, saddle, the top of a cliff, or some other point that must be reached with the trail. By starting at such a point and locating down hill, no difficulty is experienced, but if one attempts to locate from the bottom of a hill towards such a point, unless the exact differences in elevation and distance are known, the point will not be reached without either slack grade or adverse grade in the trail. This statement applies to trails on a supported maximum grade, and not so particularly to trails in an ordinary rolling country.

A trail should be placed on that side of a stream where the snow leaves earliest in the spring, provided the cost is not too much in excess of a trail on the opposite side. The two sides of a stream should be carefully examined as to the relative amounts of rock that will be encountered, since rock construction is much more expensive than any other. The slope of a hillside, the amount of clearing necessary, the growth of vegetation, and other similar points should be taken into consideration before final decision is made as to the location.

The minimum width of clearing should be not less than six feet, which allows for passage of pack animals without striking on either side. If the growth of vegetation is very rank, it would be necessary to clear wider, and in some parts of the country, on the west side of the range, owing to the snow brush, salal, and other brush that seems to hug close to the ground, it may be necessary to clear 12 to 15 feet in width. The average width of an ordinary pack is from 44 to 46 inches.

The minimum width of tread should be 12 inches, and it is not believed that more than 18 inches is necessary in any case. This affords ample room for an animal to travel and any additional width is filled up by sliding material from the upper side. Where blasting is done, the tread will probably need to be wider owing to the practically vertical slope on the upper side. A pack animal almost invariably travels on the outside of

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a trail. The narrower the trail, the cheaper the trail.

One very important factor which is often lost sight of in the construction of trails is drainage. If necessary, water bars consisting of 4 to 6-inch logs, laid diagonally across the trail, or shallow ditches dug across, should be provided at frequent intervals. I have seen well constructed trails, where this feature was omitted, practically ruined in one Winter. The distance apart that they should be located depends altogether on the grade of the trail, slope of the side hill, and precipitation during the rainy season.

The foreman should be a man thoroughly competent to handle other men, and one accustomed to trail work. Probably the most important man in camp is the cook, and too much importance cannot be laid on the fact that he must be a man able to provide good wholesome food, at an economical cost. In the organization of crews, we have found it policy to use the same men for swamping, bucking, grading, etc., on the theory that if these men are used at the same work all the time they become more proficient in it than if changed from one kind of work to another.

Due to the fact that there are so many varying conditions, it is hard to give costs which would be of any particular value. On the west side of the mountains, costs on several hundred miles of trails show that it varies from about $100 to as much as $1,200 per mile; the latter figure, however, applies to but one trail we have constructed, and that is entirely in steep, solid rock sidehill. The maximum figure, aside from this one trail, is perhaps $550, and this high figure was reached on account of the trail being benched out to a width of 4 feet. I believe it safe to say that under normal conditions, through heavy brush and much down timber, that trails can be constructed for a maximum of $300, with perhaps an average of $150 per mile.

Telephone Lines.

More essential in the construction of telephone work than in the construction of trails is the systematization of the work.

With an initial point, where connection should be had if possible with some commercial company's lines, in order to allow of the transmission of messages to more distant points, the telephone line should be extended along the main lines of travel into the territory to be protected. Before work is started, it is necessary to know the approximate mileage of line that will be finally constructed to thoroughly protect the given area. With this known, it is possible to decide on the size and kind of wire which will be used. Under ordinary circumstances, No. 12 iron wire should never be used, for the reason that its conductivity is not great, and its tensile strength is low, hence it is easily broken.

One point I wish to bring out now is that a metallic circuit or two-wire telephone line has no advantage over a grounded circuit or one-wire line, unless the telephone line parallels a high tension power line, or is paralleling other telephone lines, from which induction might be picked up. Understand that, through the forests, a grounded circuit or one-wire line is far preferable, and in fact is the only line to use. Formerly, before electricity was so generally used, and before electric car lines were in operation in the cities, all telephone systems were the one-wire or grounded systems; with the advent of electricity, it was necessary to use the two wires, in order to do away with constant trouble. This is a point, I believe, on which many people are not clear.

Knowing the approximate mileage of wire which will ultimately be in the system, it is easy to determine whether it will be necessary to use copper wire for a portion of the line or not. No. 9 iron wire, which one may say is the standard used in the forest service, will answer very nicely for distances up to 125 miles, with perhaps 15 instruments connected on the line. For greater distances, or if the number of instruments for any reason is much larger, it may be necessary to use either copper wire or copper-clad wire for a portion of the line. Neither of these wires, however, should be used with swinging insulators, for the reason that copper is too soft to stand the continual swaying through the insulators. Suppose that it is desired to ultimately have in a certain district 100 miles of telephone wire; No. 9 wire would be used which weighs approximately 310 pounds to the mile. No. 12 iron wire (and each of these is the second grade known as BB) is used for tie wire, since it is desired to have the tie wire weaker than the line wire in case a tree falls over the line, when the tie wire should break and not the line wire.

If the line is to be constructed through the timber, where there are sufficient trees to afford supports, a swinging insulator, differing very materially from the ordinary glass insulator, is used. It is a two-piece porcelain insulator which is placed over the line wire, one end of the tie wire wrapped around the groove, and the other end of the tie wire attached to a three-inch steel staple driven in the tree. About every sixth or seventh tie, depending upon the topography of the country, the line is tied tight to a glass insulator on a bracket. This is in order to prevent the slack all running to one span in the line.

When the swinging insulator is used, it is necessary that a great deal more slack be left in the line than when using glass insulators. A sufficient amount of slack should be left so that a tree falling across the line will carry the line wire to ground and will not break it. As explained above, the tie wire used is weaker than the line wire, and if another tree should fall across a span or two beyond the first tree, it would pull or break one of the tie wires and still allow the line to go to ground. With an ordinary pole line, where the line wire is tied to glass insulators, such an accident would break the line wire and therefore destroy communication. Where the swinging insulators are used, I have known lines where 120 trees were across the line in a distance of 12 miles, and we were still able to talk very nicely over the line. We could not, however, ring through on it.

Telephone instruments should be installed at intervals along the line, either the ordinary wall set in cabins or the 1336-E iron sets in exposed places, so that under ordinary conditions it is not necessary for a patrolman to ride more than 4 or 5 miles to reach an instrument. In addition to these instruments, there is a portable telephone set in use by the forest service weighing approximately 9½ pounds. It is in an aluminum case, and this is placed in a leather case with a carrying strap, so that it can be handled very easily. It is equipped with a two-bar generator of a special construction, giving as great strength so far as ringing is concerned as the ordinary five-bar generator. The set is further equipped with a standard aluminum Bell transmitter and receiver. With this instrument, there is also provided about 20 to 30 feet of rubber covered wire and a ground rod. In case of emergency, the patrolman can attach one end of his wire to the line and the other end to his portable instrument, push the ground rod into the ground, and ring up any place he desires and carry on a conversation.

The cost of this instrument is approximately $38. It is made by the Western Electric Co. The cost of the 1336-E iron telephone set, which is smoke, dust, water and acid proof, is $23, while the cost of the ordinary wall set is $10.25. The cost of No. 9 iron wire, which is a special price to the forest service, is $9.98 per mile. The No. 37 split tree insulator costs $27.50 per thousand, and approximately 40 of these are needed per mile. This would make the approximate cost of material per mile of line $11.20.

The cost of swamping is dependent altogether upon the amount of brush encountered. This should not be, under ordinary circumstances, more than about $15.00 per mile. The cost of stringing where the swamping is properly done should not exceed $8.00 per mile. This makes a total of $34.20. To this, must be added the cost of freight to the railroad point and the cost of packing from the railroad to the point of use. Under normal conditions, this should not exceed 3 cents per pound for packing and railroad freight, both making an additional cost of approximately $10.00 per mile,

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a total of $44.20. We have constructed lines on the west side of the mountains under normal conditions at prices varying from $42 to $83 per mile, the higher cost being in a place where it costs us 6½ cents a pound for all supplies and materials for the line, amounting to over $20.00 for the material used in the line alone, not taking into account the food supplies, etc., carried in. On the east side of the mountains, we have constructed tree lines as low as $34.00 per mile.

All material and supplies used in the construction of our telephone lines are standard, and those used in larger quantities are secured on annual contract. We have found that the use of standard articles promotes the efficiency of the line, the service ,and allows us to connect without any difficulty with practically all of the operating companies' telephone lines. Construction in the timber is governed largely by good hard common sense of the men constructing the line. We have rather full and complete instructions for the construction of our lines, and in this part of the country have experienced but little difficulty in having the lines so constructed as to be of the maximum service.

The use of insulated wire laid on the ground for emergency purposes was tried out rather thoroughly in the Summer of 1911, with poor results, due to the fact that in damp or wet weather the leakage in the line was so great as to put it out of commission. It is believed that if a very heavy "O. K." weatherproof wire was used, that it would work very satisfactorily, but owing to the excessive cost of such wire it has not been considered feasible. The heaviest wire we used was No. 18 copper, with a triple braid insulation. In dry weather and for purely emergency purposes, such for instance as reaching a fire camp, this wire might be relied upon, but for anything like a permanent line or anything approaching permanency its use is not recommended.

In closing, I wish to again emphasize the need for outlining the system of work to be carried on for the complete protection of the area in question before any portion of the work has been started. Experience has proven, time and time again, that if this is done much better and more economical results are obtained. (Applause.)

MR. BUSH'S ADDRESS.

Carl Bush of the Western Electric Co., Seattle, spoke of the advisability of having adequate telephone equipment for use in patrol work. Mr. Bush illustrated his remarks by a practical demonstration of the several kinds of apparatus used and by means of resistance showed a portable set, which with batteries weighs less than ten pounds, ringing ten bells at a distance of fifty miles. Mr. Bush's remarks received the close attention of the delegates. He said:

Gentlemen: During the past year there have been no particularly striking developments in the construction of telephone lines or apparatus for fire service. There have, however, been numerous refinements of apparatus and methods.

The most noticeable tendency in apparatus construction has been to substitute for the old wooden sets, wherever possible, weather and bullet-proof metal sets such as those exhibited here today, which in actual service have proven entirely satisfactory. The added security they give to the service has been very marked and we believe warrants the additional cost. As explained last year, there is no radical difference between the apparatus used in the metal sets from that used in the standard wooden sets of the same general character, the chief difference being in the method of housing the equipment and in the special protection to prevent condensed moisture inside the set, or what little moisture may be driven into it from the outside when it is in use, from injuring the apparatus.

In all cases, telephone equipment, whether mounted in a wooden cabinet or the metal case, should have three essential features looked after carefully:

First: There should be sufficient power in the generating mechanism to ring the various bells or other signals placed along the line. This generator should be compact, built to run as easily and smoothly as possible in order to make it easily possible to give clear, distinct signals on the line, and should be of such mechanical construction that the use of it will not appreciably wear the bearings within a reasonable time.

When, as in metal sets, protection from weather is sought, all metal parts should be galvanized or nickel plated excepting where brass or copper is used, to prevent rusting. All windings should be thoroughly impregnated with a moisture-proof compound to prevent moisture entering the windings and short circuiting them. Contact terminals should be painted with a satisfactory weather-proof paint and possibly the use of beeswax might be considered necessary also to assist in taking care of moisture condensing from the air enclosed within the set under various changes of temperature.

Second: A signal bell, where such is needed, should be looked after carefully to see that it is sufficiently sensitive to give a maximum sound with the minimum of current furnished by the generators along the line. In most cases, your telephones are called upon to give extremely hard service under conditions varying from first-class lines to the poorest type of construction. Under these circumstances you cannot look after your signalling equipment too carefully. Like the generator equipment, the ringer should be protected from moisture in every possible way and along the same general lines.

Third: While we ordinarily consider talking equipment to be first in every essential in connection with telephone apparatus, yet in forest work it is not of first importance, for without signalling apparatus which is entirely satisfactory in every respect, there will be no possibility of using the talking equipment. Of second importance, however, the talking equipment is practically on a par with the ringing equipment, because if the talking apparatus is not satisfactory in every respect, after the party has been signalled, no conversation can be had. The talking service must be clear and distinct in order to carry on conversations in a satisfactory manner. There are four distinct parts to the talking apparatus which are worthy of mention.

The Transmitter.

First: The transmitter. The transmitter of the standard telephone is perhaps its most sensitive part. It has been found, after experiments extending over a period of thirty years or more, that the most satisfactory material for manufacturing the current-changing part of the transmitter is carbon. In our standard transmitter, the carbon parts consist of two carbon buttons and a quantity of finely granulated carbon, all of which is of special grade and very carefully finished, included in a small metal chamber, one of the buttons being arranged to vibrate in unison with the diaphragm of the transmitter where the air from the voice strikes it.

Obviously this carbon must be kept dry at all times, as carbon of any character has a tendency to absorb moisture and the resultant changes of resistance and mechanical properties would be such that the transmitter would be practically useless. Consequently we use every possible precaution to protect our transmitter in the metal sets from moisture. Moisture protection is obtained by the use of rubber, beeswax and other impregnating compounds and the transmitter is carefully sealed to prevent moisture entering it in any possible way. In the standard wooden set, this special protection is not necessary as the ordinary mechanical protection afforded by our system of manufacturing is sufficient to protect the transmitter where it is not placed directly in the open.

Included in circuit with the transmitter, are the primary coil of the induction coil and the batteries which furnish the talking current. These two items also need to be watched carefully, particularly in the metal set. In our metal set, the induction coil again is impregnated carefully to prevent moisture entering it and disturbing its relations with the secondary and core of the coil. The batteries should be chosen for long life rather than for any other consideration and where moisture may accumulate sufficiently to saturate the cardboard case of the battery, these cases should be first boiled in paraffin or beeswax before the

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batteries are put into the set. Under ordinary conditions, however, this is unnecessary.

The Receiving Apparatus.

The second part of the talking circuit is the receiver. The receiver, while not so sensitive as the transmitter, requires great care in its manufacture. The receiver consists essentially of a permanent magnet with a pair of small magnet coils mounted on one end and a suitable shell holding a diaphragm made of soft iron in proper position to be acted upon by the magnet, the whole being enclosed with a cap suited to fit the human ear nicely and arranged with the necessary terminals for connecting to the circuit. In the exposed sets, the receiver magnets need special protection and should be thoroughly impregnated with a moisture resisting compound. The receiver cords should also be carefully manufactured and protected from moisture in a similar manner. In series, that is in circuit with the receiver, is included the secondary winding of the induction coil and there should also be included in circuit with the receiver in all telephones that are to be placed on lines where more than one telephone is connected, a condenser. The technical explanation of this condenser is too long to be given here. Suffice it to say that where the condenser is used, if a receiver is accidently or purposely left off its receiver hook, the telephone and the rest of the line will not be put out of service, so far as signalling purposes are concerned, whereas if the condenser is not used and the receiver is left off the hook on any telephone on the line, it will be practically impossible for any party on the line to call another until that receiver is replaced.

The vast importance of this condenser equipment can be readily understood when we think of the many possibilities of the user of the telephone leaving the receiver off the hook. It is not at all out of reason to think of a man or woman hastening to a telephone to report a fire, fainting or becoming overcome in some way as soon as the message has been given in, and falling before the receiver is replaced on its hook. In this case just at the time when the line is needed most, the whole line will be out of service. With the condenser equipment, however, this is absolutely avoided.

The condenser is manufactured in such a way that no moisture-proofing is needed, as one of the essential features of the condenser is that it shall be thoroughly impregnated with paraffin before it is enclosed in its metal case and the opening covered with a heavier compound. The secondary coil of the induction coil of course should be impregnated in the same way as the primary coil. as it is very essential that these two coils do not come in electrical contact with each other or with the core.

I have covered in detail the essential features of first-class permanent telephone equipment. I should like to say a few words with reference to portable equipment, as this also constitutes a very important part of any modern forest telephone system. The essentials of portable telephone apparatus are very similar to those of permanent equipment, but it is necessary to economize in space and weight in every possible way. It should be definitely understood that 'the greater part of the weight of the portable telephone set is contained in the magneto or generator which furnishes the signalling current to ring the various bells or signals along the line. As the output or power to be obtained from one of these generators is dependent first upon the speed at which the generator can be driven, and second the amount of active metal which is used, it can readily be seen that in order to get a light weight equipment we must drive our generator at an extremely high speed or else the weight of the active metal used in the construction of the equipment will be too great.

There are mechanical limits to the speed at which a generator can be turned and also an electrical limit. It is generally unsatisfactory for the usual telephone circuits to use current changing polarity, or in other words alternating at any frequency greater than 16 2-3 times per second. The average generator driven at 900 revolutions per minute, gives this alternation. With the limit set on the speed in this way, the next step is to reduce the weight of the necessary metal used in the generator, to the lowest possible amount.

Portable Set.

We have evolved a special light weight portable set, exhibited here, which has been designed primarily for use by the Government Forest Service, but which will be ready for the market this coming season and can be had by anyone on payment of the usual price. This equipment uses a special generator which has been particularly designed for this kind of work and embodies a number of new features, particularly in the kind of material used. While this generator is not sufficiently strong to ring every telephone on a 50-mile line where there are 15 or 20 sets on the line, it will in all cases ring the nearest telephone or a number of telephones, so that anyone equipped with this portable set can ring some telephone and have his call relayed along the line to the proper party. We recommend this type of set only for such places as an extremely light weight set is needed and recommend, wherever weight is not so great an object, our heavier set known as the No. 1330 type, which uses the same general equipment as that included in our standard five bar telephone set, and will do the same work in every way.

As practically all the telephone circuits in which you are interested, are one wire grounded lines, it is necessary, with the portable set, to provide a suitable grounding arrangement which may be carried with the set. We are exhibiting the equipment developed for the Forest Service for this purpose, which appears to us to be satisfactory in every way. We also exhibit some of the special portable copper wire developed for the forest service for use in emergencies, to be carried into the woods a reasonable distance from the main line.

We have arranged an exhibit of telephone equipment for you, so far as possible mounted and connected in the usual fashion which has been found the most satisfactory by the Forest Service and ourselves. We have included in each case the usual lightning protection equipment and other accessories that are sometimes used under varying conditions, and will be very glad to explain in detail any of those parts to any of you who are interested, either now, or later by mail.

There have been no material changes in line construction during the past year. In general we are still recommending No. 9 B. B. galvanized iron wire to be used for all circuits and, where the lines are to be built through the woods, the standard Forest Service split tree insulator which is known as our No. 37 and attached to the trees with a short piece of stranded wire, called by the manufacturers "Seizing Strand." This departure from the single strand wire, formerly used, resulted from the testimony by Mr. DuBois of San Francisco at last year's meeting, that the single strand wire often crystallized, allowing the line wire to go down. We believe this will not happen with the multiple strand just mentioned. In all other respects, we believe that the general construction followed by the Forest Service and recommended by us last year will be found entirely satisfactory. (Applause.)

DISCUSSION.

Wells Gilbert, Linn County (Ore.) Fire Patrol Association: I was much impressed by the telephone discussion at last year's meeting and our association ordered three of the big iron instruments and a number of portable sets. The first were excellent. The portable sets came without bells and were not satisfactory, but the manufacturer is to replace them with bell sets for next season. Mistakes like this, in not knowing just what we want, costs us lots of money and we need a good manual on the subject. Mr. R. B. Adams, the Forest Service telephone expert stationed at Missoula, has written an excellent treatise on forest telephone work and I wish this association could print and distribute it.

Mr. Davies: This book is very complete, with diagrams explaining nearly everything. The Coeur d'Alene Association used it last summer.

President Flewelling: I will appoint Messrs. Shattuck, Davies and Silcox a committee to confer with Mr. Adams and see what can be done to have this mimeograph treatise printed, if possible by some publishing house that will undertake it commercially without expense to this association.

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POSSIBILITIES OF WIRELESS IN FIRE WORK

C. B. Cooper of the Marconi Wireless Telegraph Co., Seattle, spoke of the possibilities of wireless in forest fire work, R. H. Sawler, who was to present this topic, being absent in Honolulu. Mr. Cooper said, in one of the most interesting and closely-attended talks of the meeting:

MR. COOPER'S ADDRESS.

Gentlemen: I am not well enough posted on your work and there has been no time for me to procure from the company a detailed description of the apparatus they would propose. Therefore, I have confined myself to generalities by showing possible simple construction of the apparatus, plan of use, and approximate first cost of apparatus, and just as you are the pioneers in building trails and the equipment for the preservation of our forests, so is wireless the big pioneer who has built the new trail and equipment for preservation of life and property at sea, and there is no reason why it cannot join with you in the forests.

You now have and are installing telephone lines, and we have just heard relative to the cost, etc., of these from Messrs. Herring and Bush. Therefore, there is no use of my repeating what they have said. Roughly speaking, the telephone line costs about $35.00 per mile to string on trees, which means an exceedingly fine means of communication, provided the line stays up, and you know from actual experience the troubles that ensue in keeping this line in repair. Then in an emergency you cay lay your telephone wires along the ground, but the work entailed is very great and in case the fire is very exhaustive it is considerable time before you can connect the various fighting forces with your base of supplies or with the foreman in charge of the work.

However, as I say, there is no use of my going extensively into this, because you know the inefficiency of limitations of the service from actual experience better than I can possibly know. There is no forestry wireless service at present in America that we can point to as an example showing where it has done the work. Therefore, first, we must understand that the whole idea of wireless in the forests is purely experimental. It is working now over and through the forests on the Pacific Coast, but it is not working in them. Therefore, I cannot come to you and state positively whether wireless will correct your troubles with the telephone system and give you the ideal communication so much needed, but I think it will work, and so does the company with which I am connected.

Portable System Needed.

In designing and building a wireless outfit for your work, the first thing to be considered is that it should be so designed as to permit of its being packed on mule back, as the localities at which the equipment will be found necessary are inaccessible in most cases by any other method of transportation. The average mule pack weighs about ninety pounds on each side of the saddle, and the usual width of a pack is about 44 to 46 inches. Therefore, it would be necessary to build a wireless outfit in units to conform to these specifications. The maximum distance at which it would be necessary to establish communication would be about 100 miles. Therefore, the apparatus must be built powerful enough to cover this distance. And such an apparatus, namely: One built in units weighing about 90 pounds, so as to permit of its being carried by mule pack and one capable of transmitting 100 miles, could be designed and built for about $1600, exclusive of mast equipment. The mast equipment would, of course, mean trees as high as you could get them standing, and if in the exact locality at which this apparatus is to be set up there were no tall trees, then it would be an easy matter to build on to what trees were handy, by splicing on an extension similar to a ship's mast.

The idea is that two of these equipments should first be installed as an experiment at a distance of about 100 miles apart, and of course at points between which there is now trouble in keeping telephone communication, or where it is essential that communication be established.

And right here let me explain that one of the most essential features in good long distance wireless work is that you have trees or masts as high as practical, so that you can raise your wires well up in the air, and the trees or masts should be from 200 to 300 feet apart, especially for this hundred-mile class of station which I have mentioned, so that you can get a good long spread of aerial wire. This aerial is part of the wireless equipment and consists of two wooden spreaders about ten feet long, and attached to this is an aerial, which consists of from four to six wires. These spreaders need not be carried in the pack, but can be picked up when needed, as any light 10-foot stick would answer.

After these stations have been proven successful, and I am sure they can be made to prove so, you would then have the data as to the exact requirements of the service and could undoubtedly then be able to reduce the cost of construction very materially, and especially so as these outfits that we now speak about are designed to work 100 miles, and there is undoubtedly a lot of the service which you would wish the wireless to perform that could be done with much smaller apparatus, as distances in this other service would probably average not more than about 25 miles.

After the equipment is installed you would require a competent operator at each of these 100-mile stations. Such a man can be procured for about $75 per month and board. Then you would want to have these operators instruct such patrolmen as you designated sufficiently well in the telegraph code and the use of the apparatus, so that they could communicate or report in, as I understand they now do by telephone, once a day or as often as required. At first you could only use simple calls for each man, so that when he reported in he would only have to use his call. It would only take three or four days for a man to become familiar enough with the code to do this, and in about six months they would be fairly capcome proficient enough to send in other matter, and in about six months they woul dbe fairly capable operators. It would only be a question of time before the knowledge of operating would be one of the requirements of a patrolman's examination. You would, of course, plan to start this training of your patrolmen as soon as practical after the installation of the two sets, so that these men would be prepared to handle other outfits of the size necessary for 100-mile working, or smaller outfits as the service may then show necessary.

Power to Operate Plant.

The power to operate the larger equipment would be an engine of the motorcycle type, directly connected to an alternating current generator and exciter. These engines would weigh about 75 pounds and the consumption of gasoline would be very small, because power is only used for sending messages, and not for receiving, and the engine would only be run when actually necessary for reporting, and by proper economy a gallon of gasoline would probably last for ordinary use for some days. Then for the smaller outfits this type of engine could be used, or you could possibly use storage batteries. There is now in service on ships storage battery outfits as auxiliaries that meet the requirements of the United States Government to work 100 miles, and where they are used on ships where a large spread of aerials can be gotten, these outfits have worked over 200 miles day and night, so that you can see it certainly seems feasible that storage battery outfits can be built to cover 25 miles or probably more, because trees should always be found available from which an aerial could be strung to advantage, and by adding more powerful batteries, the extra resistance that the woods would offer to the impulses and the less distance required, would just about minimize the two workings, as an example of the feasibility of battery outfits. These storage battery

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outfits could be condensed so that they could be carried over a saddle.

Now, as I have said before, there is no use in my wasting much time in talking about the difference in cost between telephone and wireless. That you can see for yourself, as right now as a first experiment it is estimated that a 100-mile equipment, that is ,two stations that can be packed to any part of the bush you wish, whenever you wish, would cost about $3200, while the low estimate of $35 per mile for telephone would bring the cost of 100-mile working up to $3500, and it means that when service is once established by wireless between any two points it is always established. We have stations that have been in operation for years without being out of commission at any one time for more than an hour. And, further, 100 miles of communication by telephone gives you communication simply in a direct line, or, rather, simply along the line of telephone, and you have telephone stations installed at various points along that line. You would duplicate this idea by leaving aerial wires installed at various points along the line, so that the patrolman would simply have to hook onto these his portable outfit in order to establish communication with the larger sets. Then, and here is a big item as I see it, this 100-mile working in wireless is 100 miles in every direction, so that in case of fire off the beaten trail it would not be necessary for a man to go back to the telephone line in order to make a report, but he would set up his apparatus just wherever he happened to be in that 100-mile radius, ask for help, supplies or whatever was needed, and stay right on the spot, doing what he could to get the fires put out, without losing any time at all. The question arises here as to just how powerful an apparatus it will be necessary for a ranger to carry with him in order to perform a service like this, but that, of course, is a matter of detail which would have to be worked out from the experience gained in the building of the two 100-mile stations, and there is no doubt that either a battery outfit or a motor outfit can be so designed that it will be perfectly practical for it to be transported for this service.

Just yesterday I was talking with a gentleman who described a fire in Oregon to which he was sent last year. He said the fire extended over a section of about five or six miles in extent. His special duty was to lay the telephone wires in order to get connection with the base of supplies, and from the foreman in charge to the various gangs around the fire. It took exactly three days to get communication and in that time there was absolutely no way, except by messenger, to find out what the various gangs were doing, what supplies they needed, food, etc., and several men were used as messengers. With portable wire outfits they would have had communication continually, and they would have been installed in practically no time, and small battery outfits would have answered this purpose perfectly.

I think there is nothing further I can say, and I do not think I have taken up the full fifteen minutes allotted to me. But I hope that next time either I or some other representative of our company will find it necessary to try and steal some of some one else's time in his efforts to show what has been done and what can be done to help in the mammoth work in which we are engaged for the protection of the forests, the backbone of the business of the Pacific Coast. (Applause.)

Discussion.

Mr. Humbird: Do local atmospheric conditions affect wireless service?

Mr. Cooper: No. We produce a high frequency note that grinds right through any disturbing static note unless in some extreme case like a thunderstorm.

Mr. Allen: How about crossing elevations higher than your stations?

Mr. Cooper: That depends on how close your station is to the elevation. The vibrations act something like a thrown ball or a bullet. They would always go over, but if a close-by slope makes the sending angle too steep, there is uncertainty as to where they would come down. It would be better to get at a distance from any very high ridge. Then it would do no harm. Still, our Ketchikan station is in a valley with a high elevation between us and the Coast.

Mr. DuBois: If the station were on a high lookout point in a lightning zone, would the operator be in danger?

Mr. Cooper: I know of but two instances of a wireless station being struck by lightning, although in the old days we used to have them on peaks when possible. The aerial is always grounded and somehow seems to create a zone free from being struck. There is no more danger in a wireless station than there is in the woods because every tree is a good conductor.

Mr. Herring: You spoke of portable wireless equipment. What sort of aerial must the ranger put up?

Mr. Cooper: Simply the bigger the better. Of course, the best way would be to have aerials permanently rigged at convenient places, so as to save time. Then, in emergency, the ranger would merely connect his portable sending equipment and call the nearest high-power permanent station. But probably he could always find trees on which he could stretch a portable aerial in an hour. It is a soft copper wire.

Mr. Cameron: Would he have to cut out the trees between the two ends?

Mr. Cooper: He would probably find two trees higher than those between them. Some interference would not be serious. This portable equipment would not be for more than 50-mile service anyway, yet we use wireless on sailing ships where the rigging and sails are as bad as trees.

Mr. Cameron: Must he signal from a ridge?

Mr. Cooper: His chance of working from a valley would depend largely upon the location of the main station he seeks to reach and the ground configuration between them. If not too close to a steep slope he might get out of the valley all right.

Mr. Campbell: What is the annual depreciation of wireless equipment and what are operators paid?

Mr. Cooper: The depreciation is exceedingly small. Experienced operators, willing to work as rangers in addition, can be had for $75 a month and board.

Mr. Herring: High-school boys interested in wireless can be had during the vacation months for practically nothing. They like to get the practice and live in the woods. They would be only operators, however, and would have to be taken care of more or less by the rangers.

Mr. Cooper: We have tried the amateur and don't think it pays. The best way is to have a mature practical operator and give him other work to do if necessary. As a rule they like something to keep them busy. They can listen for calls every so often. This is better than any system of signal calls, for with the latter the operator depends wholly on the call and has too good an excuse for not getting it.

Mr. McMillan: Would the purchaser of wireless equipment have to pay any further royalty?

Mr. Cooper: No. It would be his absolutely. He could do a commercial business if he desired.

Mr. Gladwin: What power is necessary for the generator at the main stations you propose?

Mr. Cooper: Seven horsepower of the motorcycle type will run a five-kilowatt apparatus. In Seattle we use only two kilowatts.

President Flewelling: We should thank Mr. Cooper for a most satisfactory description of wireless possibilities in forest work. We should keep in touch with it and use it if it proves practical for us. I hope we can have some experimental sets installed and report experience at our next annual meeting.

Mr. Paterson: Before leaving this subject of fire communication, I should like to hear whether carrier pigeons have ever been tried. We tried it once in a logging camp 150 miles from our base of supplies and found it satisfactory except that hawks caught some of the pigeons on their way out. It might be worth experimenting with.

President Flewelling: There is too much uncertainty about a pigeon. The ranger might eat it.

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MEN, TOOLS AND SUPPLIES

Coert Du Bois, U. S. District Forester of California, opened discussion on men, tools and supplies in fire fighting, with the following address:

MR. DU BOIS' ADDRESS.

Gentlemen: Unless men, tools and supplies are arranged for with the minutest possible detail-in-advance plans for fire prevention, there will not be any for fire-fighting until it is too late.

We had a big fire in Southern California in August, 1911. Ten men were on the fire line within an hour after it started. But it got away and burned for 14 days, covered 16,000 acres and cost the Government about $30,000. Before we got through with it we had over 700 men on the line. As soon as the ashes were cold the best available man from the district office in San Francico was on the ground gathering the detailed history of the fire and studying the facts he found. We learned a good deal from that fire. We learned that the ranger's telephone call for men was disregarded, that our commissary was not adequately organized, that we had no forest officer at the base of supplies and that Mexican labor is useless without an over-supply of foremen. Any trouble is more than half remedied if you know exactly what's the matter.

In this case instead of having men to call on for help, we should have had an organization of men to call on. So, during the Winter of 1911-12 a canvass was made of all the towns adjacent to the forest, and in each one a man was induced to accept a position which for convenience was designated forest service agent. This man was usually a representative of some public utility or public service corporation, such as the manager of a town water department or fruit exchange. He agreed to select in advance and keep enrolled a crew of so many men; these crews to be under some form of organization already—such as packing house crews or construction gangs. He also arranged in advance for transportation for his crews, for purchasing and forwarding tools, supplies and bedding, charging expenses to the forest service. The crews were instructed to assemble at the agent's office at a given signal on the town fire alarm or packing house whistle. The idea was to put this machinery into motion when a ranger phoned the agent that his crew is needed.

The following quotation from the Pasadena News of May 27, 1912, shows how this volunteer forest fire organization works:

"MAKE RECORD RUN
Volunteer Companies Recently Instituted
Save Time and Prove Helpful

"Co-operation in fighting fires under the newly organized protection system of the U. S. Forest Service had its first real test on the Angeles National forest. A fire started in Devils Canyon, 10 miles from San Bernardino, and thirty minutes after it was discovered two auto trucks with men, provisions and tools, in charge of W. C. Starke of the San Bernardino water department, were speeding to the scene of the fire which was soon put out with little damage. This almost equals the record of some city fire departments."

The extension of this idea has been rapid. On one of the heavily timbered forests in Northern California the district rangers have perfected volunteer forest fire organizations from among the residents of their districts—each volunteer company being assigned a definite area within which it is responsible. For each company there is one chief who receives 40 cents an hour fighting time, one quartermaster and one packer, each paid 35 cents an hour and from 15 to 30 firemen who are paid 30 cents. Any additional men, not members of the volunteer crews, who are employed on a fire are paid 25 cents an hour. At the beginning of the fire season each member receives a circular letter from the district ranger telling him the names, addresses and officers of his company and the boundary of its fire division, the number of pack horses and saddle horses available at each ranch, the duties of each member on report of a fire, the rates of pay for labor, horses and teams, the location of tool and grub caches, a brief resume of the district fire plan and a statement of the objects of the organization and the bearing of fire protection on local interests. As the men selected are all small local ranchers and are all connected on farmer phone lines, these organizations have worked almost automatically. Although 20 or more fires have occurred in the area covered by these volunteer companies, we have never had an opportunity to see how they work in a bad fire because they have never let one get bad.

In sparsely settled localities, highly-organized volunteer help is out of the question, of course. We are meeting such conditions with what we call the stationary patrol. During the peak of the fire season as large a number of short term forest guards are employed as can be squeezed out of the forest allotment. These are stationed at centers of accessibility throughout the ranger district and in every case at a phone. They are given strict orders not to get out of ear-shot of the phone bell and never to leave their stations except under orders from the district ranger. Each station is fully equipped with tools and kept provisioned for two weeks ahead. The entire district is commanded by lookouts who are in communication with the district ranger.

Duties of the Lookout.

A lookout locates a fire. He reports it to the district ranger, giving its size, exact whereabouts and the speed with which it is spreading. The district ranger telephones one or generally two of the nearest guards who start immediately with two days' grub on their saddles. The ranger then organizes a crew and a commissary to follow the guards and hold them until the lookout, who is watching the progress of the fire, advises him to forward the reserves. In a remarkably large number of instances the first detachment controlled the fire. In one instance where it did not, the excellent team work on the part of lookout, ranger, guards and a hastily drafted volunteer crew put 25 men on a fire line far back in an inaccessible gulch six hours and a half after the first smoke raised, or at midnight. The fire was under control by daylight and when the men had eaten breakfast they finished the last of the supplies that went out with the crew. The pack train, with a reserve of grub, sent out by the ranger immediately after the men had started, arrived before dinner.

If fires could be depended upon to occur in only one type of ground cover it would be an easy matter to develop a specialized tool with which to fight them. But they will not. They will occur in heavy brush, in rank grass, in down timber, in deep pine needles or in bear clover, and no tool that does not combine the cutting edge of an ax, the digging edge of a hoe, and the scraping teeth of a rake, is going to be absolutely safe for a patrolman to carry in all types of country. But every forest officer hates to give up his dream of the one perfect fire tool. To encourage invention I have adopted the policy of having six or eight tools made up from any model that is sent in from the forests and sending them out for a thorough field trial. I have also agreed to name any successful tool after its inventor.

Several types of take-down combination tool have been tried out but the only one approaching success is the McLeod tool, developed on the Sierra National forest. This consists of a wide-spreading short-pronged trident, each prong ending in a collar and thread. A heavy hoe blade and a rake blade, each about 14 inches wide and 6 inches deep fit back to back over the ends of the prongs and are fastened rigidly with wing-nuts. A short wooden handle—half a hoe handle—fits into a socket in the iron trident handle. The removable blades fit into the regular service cantinas and the handle is packed under the stirrup leather rifle-style. This tool, supplemented by a heavy hatchet hung on straight ax helve, has proved a very effective patrol outfit in the type of country comprising the bulk of the lower west slope of the Sierras.

But whatever we arm the patrol with, we will continue for some time to equip the fighting crews with the shovel, hoe, rake, ax and brush hook. The problem is not so much what to use as how to get them there. The tool cache is widely used

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in the California forests and it requires thorough knowledge of the fire hazard and nice discrimination to know just where to locate them. The boxes are left unlocked and inside the cover is tacked a map of the fire division showing the location of other tool boxes, phone lines and phones, patrol stations, trails and roads, together with brief directions on what to do in case of fire. As rapidly as possible in the back country we are supplementing the tool boxes with a locked compartment containing non-perishable food supplies, a cook outfit, blankets and a spool of insulated emergency phone wire.

Wherever country stores are available and are properly located, they are made complete fighting bases. The storekeeper is furnished in the Spring with several grub-lists—"List A," "List B," etc.—each for so many men for so many days. Where pack horse transportation is used he keeps one list packed in service-owned kyacks. He also stores service tools strapped up in bundles of ten, and by advance arrangement with the district ranger, he agrees to rustle transportation and deliver tools and grub at any point in the district on telephone order. Many of these storekeepers are our labor agents too, so when the ranger rings the phone bell the storekeeper does the rest.

Need of Organization.

Even with an adequate crew on the fire line properly armed and provisioned, the need for close organization does not stop—in fact, right there it begins to get serious. One of the hardest things that I have had to do is to make the rangers keep away from a shovel handle when on the fire line. They are beginning to realize that a back can be hired for 25 cents an hour but a head is worth $1,200 a year. It is a definitely fixed rule on the National forests, and a rule generally accepted by the volunteer help, that the first forest ranger on the ground is in charge of the fire. He sizes up the fire, plans the attack, divides the crew into divisions, appoints division leaders, a cook and a timekeeper if necessary, picks the camp and takes charge of the commissary. He must determine in the first hour or two whether he is going to be able to handle the fire with the men he has and if not he must get reserves.

A big fire is very bad for the forest, but it is the finest thing in the world for a protective organization. Every ranger must go through at least one before he learns that the headwork of running it will take all his time.

On some of the forests where there is a particularly efficient man clerk in the supervisor's office, the practice of sending him out as quartermaster on big fires has been tried with success. He checks and issues equipment and supplies, keeps the time of the men, attends to the transportation and makes out orders for further supplies, thereby relieving the ranger in charge of considerable routine and allowing him to keep a closer watch on the progress of the fight.

Prompt payment of all fire-fighting bills is not only good business but a good protective measure—for with long overdue bills your labor, your tamsters, your furnisher of supplies will be far from enthusiastic about helping out next time. With a clerk-quartermaster on the line vouchers can be signed in the field, and together with the pay rolls they can be sent to the nearest mailing point by messenger. All fire bills have right of way over other accounts in the office of the fiscal agent in San Francisco, and it has often happened that a crew coming out of the woods after a five or six days' fight have found checks for their first two days' time waiting for them in town. This is worked by having the ranger telephone in the time to the supervisor's office from which data the clerk makes up and forwards a preliminary pay roll. When anything really bad breaks out which requires a hundred or more men a disbursing officer leaves San Francisco with a check book and pays off by hand in the supervisor's office.

Analytical studies of past records, comparison of fire maps from year to year and, above all, a constant watch for mistakes and a determined inquiry into the causes of them will give us the material with which to strengthen the weak spots in our protective organization. Fifty-seven per cent of our fires this year were caught and killed before they covered an acre. This is 11 per cent better than we ever did before. By further divorcing the protective from the administrative work, by a closer use of the funds available, by trying out certain new ideas whose value has not yet been thoroughly tested, and by keeping up the force all along the line before we quit, we are going to make the average California record 80 per cent no-damage fires. (Applause.)

Following Mr. Du Bois, Frank J. Davies of the Coeur d'Alene Timber Protective Association discussed the topic in the following paper:

MR. DAVIES' ADDRESS.

Gentlemen: The best men for fire fighting are woodsmen.

This on account of their familiarity with fire fighting tools and their capability of caring for themselves in the woods, where they are frequently required to get their meals from the lunch box and to sleep on the ground. When fire fighting such men can and do take their meals standing, or sitting on a log or stump, and sleep wherever the main camp may be without feeling the inconvenience as a hardship, as is the case with good workers in other lines who are accustomed to taking their meals from a table and sleeping in a bed. And to assure a supply of this class of labor the district warden should keep in touch with all logging operations within his district, thus knowing at all times where and how many such men are available.

One of the essential features, if not the most essential feature of successful fire fighting, is the prompt transportation of men, tools and supplies to the fire front. If the tract to be protected is well traversed by railroads this is comparatively easy as they can be assembled at a town near by or within the district—being sure to select a place where all trains stop. In emergencies, and all fires are emergencies, a message to the railway company's division superintendent will obtain his cooperation to the extent of permission to send what may be necessary by the first train, and if the case be extremely urgent, the furnishing of a special train, if only a switch engine and some flat cars.

For supplying the portions of the tract not served by railroads, wagon roads should be constructed where possible, teams provided for so that there may be no unnecessary delay, and supplies and tools stored at convenient points.

Where the country is so rough that wagon roads are impracticable, good, serviceable pack trails must take their place, using pack horses instead of teams and wagons. In making these preparations it may be necessary to own your horses, wagons or pack train, and these may be idle much or all of the time; in which event do not complain of them as dead expense but be thankful that there is no occasion for their use.

The uncertainty as to where a fire may start precludes the possibility of always having men and supplies at hand, but permanent supply depots, well stocked with tools and provisions, can and should be established at the convergence of railroads, wagon roads and trails, so that any portion of the district may be quickly served.

Food supplies should be the best obtainable, substantial of course, but of highest quality; the staples being ham, bacon, fresh meat—if it can be delivered without spoiling—beans, potatoes, onions, bread and dried fruits. Canned goods are not barred except where transportation is by pack train, in which case they should be avoided because of their weight.

Tools, also of best quality, must be supplied, stamped with the association mark or initials for identification, and in perfect condition when sent out. After each fire all tools should be collected and again put in shape for use by sharpening axes, mattocks and shovels, replacing broken handles, and otherwise putting them in readiness for immediate use on the next fire.

The best tools and methods are those that will most quickly construct a fire break in front of the fire, and the tools ordinarily employed for this purpose in a rough, heavily timbered or brushy country are the axe, crosscut saw, round pointed shovel and mattock, while on more level land and in open timber a plow will rapidly construct a fire break; and even a log dragged lengthwise in

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front of a fire will often prove effective. Dynamite has been tried but is not recommended as the explosion will often add to the hazard by scattering embers. The means for constructing a fire break must be adapted to the country in which the fire occurs. If the country is sufficiently open and level so that horses can be worked, plowing is the quickest and best way, but where it is impossible to work horses to advantage we are compelled to rely upon the old method of digging a ditch or trench by hand.

Back-firing is very dangerous for the reason that unless very carefully handled a back-fire becomes a menace instead of a help, frequently getting beyond control and creating other fires, sometimes as extensive as the original. Under no circumstances should back-firing be resorted to before evening, when the wind is falling, and then between the trench and the fire line only; and the trench should be as close to the fire line as it is possible for men to work with safety.

Handling a fire fighting force requires as much ability as the running of any other line of work, and the management of it calls for men of intelligence and resource. In case of a large fire there must be a head or warden, whose duty it is to procure men, tools, supplies, etc., assemble them at the fire front, divide his force into squads of from ten to twenty men, appoint a foreman for each crew or squad, and place them where they can work to advantage and without interfering with the crew working next to them on the line. The foreman will have charge of his crew only, showing them what to do and keep them at work, while the warden will visit him at intervals, helping him with advice and information of the general progress of the fire, or the changing conditions as the work goes on. It is the warden's business to shift the position of crews as occasion demands, replace broken tools, look after the replenishing of supplies and the general supervision of the operation, keeping in touch with his crews and looking the ground over in advance of the fire, ascertaining the best places to attempt to build fire breaks.

Men should not be worked more than ten hours and timekeepers should be employed who will make the round twice each shift. Payment may be made at the end of service by time check issued by the timekeeper and signed by the foreman, which when countersigned by the warden, becomes a draft upon the Association.

In all this work careful consideration must be given the men and their safety provided for in every way possible. Lookouts should be kept to advise promptly in case of the fire becoming a crown fire, in which event the men must be withdrawn quickly to places of safety—previously located by the warden—such as barren ridges or meadows which are to be found in nearly all timbered regions, and where, should fire sweep past them, they will be comparatively safe. It is poor policy to try to run away from a crown fire driven by a high wind, and men should never be taken from these partially open spaces into dense timber.

In conclusion: The first requisite for successful fighting of forest fires is a district warden of intelligence and resource, one who is thoroughly conversant with the topography and transportation facilities of his district; who is an organizer, is diplomatic and a hustler.

Second: A supply of good men must be provided, woodsmen preferred, the warden knowing just where to look for them when needed.

Third: Tools and supplies stored at points convenient for prompt distribution.

Fourth: Considerate care at all times of the men employed.

Fifth: Cheerful co-operation among the residents of the district whether owners of timber or not, and prompt and cheerful compliance with requests for assistance by all property owners when called upon by the warden or fire committee.

Discussion.

President Flewelling: Mr. Van Dissel, what have you to say on this subject?

Mr. E. F. Cartier Van Dissel, Phoenix Lbr. Co., Spokane: Rather than talk to the subject, I want to say something that may be out of order but which I want all of you to take home with you. It is said that in the United States is about 2800 billion feet of timber and that we cut off every year about 100 billion feet; also that just about as much is burned as grows. This means the end of lumbering if the growth is not helped to get ahead of the burning. If these meetings did nothing else they would be well worth while for their influence toward keeping the burning behind so there will be something to cut when the old timber is gone.

President Flewelling: Mr. Allan Daugharty, of the Ocean Lumber Co., has some good ideas on that point.

Mr. Daugharty: If the people back in Wisconsin had had a proper appreciation of their pine in the old days, they would not have sold it at the price they did nor would they have wasted it as they did. I am appalled at the waste here in the West now of material that goes into the sawmill burners. It is the greatest forest fire you have. Many people on this Coast live within the range of their own mountains and do not see the world beyond. It is not so much what you have that you want to know about, but it is what the other fellow has not got. I feel that if the people on this Coast, who own the timber to which the world must sooner or later look for its supply, could come to a better appreciation of what they have, they would take care of it better and not need meetings like this to spur them to it.

The State Forester's office at Olympia transmitted to the conference the following suggestion recently received from Mr. J. Markson, of Tacoma:

"One day at noon I was crossing an unused trail up the Wishkah River, when I discovered a little smoke coming from among a few leaves. I looked about, saw no one, and after carefully investigating, discovered a broken beer bottle condensing the sun's rays, making it a burning glass. If glass found in the woods, especially in dry, open places, was kicked or buried under earth, it could not do the mischief I saw this trying to do. Of course, I kicked this bottle under ground and put out the fire just beginning."

E. A. Sherman of the U. S. Forest Service of Ogden, Utah, said that the conditions in his district were much different from the Pacific Coast. Ninety per cent of the lumber used there came from this section. They protected the forest from fire not so much for the protection of the timber alone, but for its influence and effect on the water flow of streams. They employed three million fire fighters—sheep which grazed in the forest. They went to the owners of these sheep and had them urge upon the herders and camp tenders the necessity of co-operation in fire protection. Many of them acted as patrolmen and the result was a notable absence of fire.

INVITATION TO VANCOUVER IN 1913.

John O'Brien of Vancouver, B. C., extended an invitation to the Western Forestry and Conservation Association to hold the next annual meeting at Vancouver, B. C. He made no promises. He only desired the association to meet on Canadian soil because of the great benefits that he expected his people to derive from the meeting. He extended the invitation in behalf of the Forestry Department of British Columbia, the citizens of Vancouver, and himself.

President Flewelling in behalf of the Association, thanked Mr. O'Brien and asked the members what disposition they desired to make of the cordial invitation.

Mr. Van Dissel said there was only one disposition to make of any invitation from Mr. O'Brien, that it should be accepted "right off the bat." He at one time had been a guest of Mr. O'Brien and knew whereof he spoke. He advised going to Vancouver in 1913.

Mr. Allen stated that the official meeting place of the Association was Spokane, but it was a question over which the Board of Trustees had jurisdiction.

Mr. Ames moved that the question be referred to the Board of Trustees with a recommendation to accept the invitation.

Mr. Van Dissel moved an amendment to the motion by the substitution of the word "instruction" instead of "recommendation." The motion as amended was unanimously adopted.

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DEVELOPMENTS IN PATROL EFFICIENCY

The final session of the convention was a most interesting one. In point of attendance, it exceeded any previous meeting. A feature was the large delegation of students from the University of Washington who listened intently to the various addresses and discussions.

The highly important topic of patrol organization was introduced by D. P. Simons, of the Sound Timber Co., long a leader in Western forest protection. His address was a notably keen analysis of the modern co-operative patrol movement and received close attention.

MR. SIMONS' ADDRESS.

Gentlemen: In trying to collect material for this talk I soon discovered two significant facts. The first is that the man who thinks there are no developments in patrol efficiency is working with a mighty narrow horizon. I have always wondered at the man who is so sure no one else can approach his intelligence that he sticks to individual patrol instead of co-operating. Now, I believe we association people have had a similar tendency to over-estimate the perfection of our own pet systems. The second point that set me thinking is the difficulty we have, once we wake up to the fact that the world is moving, of getting at just what other people are doing. This association is about our only medium and it is what all of you can tell, rather than what I can tell, that would open the eyes of the man who thinks it isn't a live subject.

For example, have you ever stopped to realize that this protective movement is just beginning to develop an absolutely new type of human endeavor —the trained forest fireman? The individual patrols of old never could, and association or official systems could not immediately, produce such a type. In the beginning we hired men of superior personal efficiency if we could, seeking woods training, originality in emergency, tact, and ability to crystallize systems of which they were part, did they acquire that one thing—training—that we cannot hire where it does not exist. We are now beginning to graduate such a trained force. Where and how we are doing so most successfully is certainly worth continual study.

Another tremendously significant development, particularly rapid since we met a year ago, is the breaking down of organization lines and the amalgamation of private, state and federal systems wherever this tends to economy and better work. No previous year has seen such progress in bringing the federal forest service, the state forester's forces and the timber owners' associations into syndicated patrols; working together to prevent fire instead of to see which must pay for fighting fires, selecting from each other impartially the best men for field captains, counseling in the employment of new men, sharing costs equitably, and in general securing the best protection of all areas and duplication upon none, with the least friction and the least cost to each.

What has promoted this co-operation? Where is it working best? What is its ultimate development? Unless there is some unforeseen check, it seems to me we are entering a new era which demands of us much abandonment of old methods based on individual responsibility and much study to make the most of this co-operative opportunity without going too far in directions that may embarrass us.

It is notable that with training and experience the leaders in fire work, both private and official, are dropping the old idea that to be practical means to do the hardest work with the fewest facilities, and are realizing that mechanical equipment increases efficiency, and saves man power just as much in the woods as in the factory. Several associations kept their assessments to the full this year, although the easy season would have permitted economy, spending the money for telephone and trail building. Next to co-operation, communication is probably the most featured line of work. The tendency is toward substantial construction, rather than makeshifts.

A 1912 development almost universal, both east and west, is the systematizing of lookout work by means of protractor dials enabling observers to telephone the bearing of fires. Two or more such readings permit accurate location. In some cases this has been perfected in the form of high towers with sighting hoods composed of vertical wires and with range finders. Equipment is constantly improved. Chemical extinguishers have been built especially for forest use, varying from knapsack devices, up through packhorse equipments, to engines for road use not unlike those employed in cities. Some of these have proved highly useful for extinguishing burning stubs. Waterbags for supplying fire crews; folding plows for trenching in open pine stands; combination hand tools; shields with mica windows to protect men obliged to work close to intense heat; portable telephone instruments; heliograph, flash, and flag signals—these and like devices are being tried out by men who formerly would have been afraid to be identified with such theoretical notions. I believe many of these things will become standard and that everyone working along such lines should report progress at this meeting.

Tool Storage.

Tool storage is being worked out systematically, both through supply depots belonging to the patrol authorities and through agreements made with camps, railroad companies, etc. Cabins and horse-pastures are located at strategic headquarters points. Arrangements are made in camps and towns for emergency labor available on call. Ration lists, cooking equipment, and all the machinery for transporting and working large gangs, are no longer left to be planned hastily by a man already burdened with the responsibility of a big fire, but are standardized and pre-arranged as far as practicable. Commercial telephone lines are advised of forest officers' whereabouts, so that fire news from any source reach the proper authority promptly.

All this proves that patrol efficiency is very far from stationary, for once these facilities become recognized branches of the business they suggest constant experiment and improvement. And it proves most conclusively that we must recognize training as essential, for it is not the newly picked-up man, however good by nature, but the man interested and experienced in this new trade of scientific fire prevention, who devises and perfects these improvements.

It is also rather interesting to observe the temporary classification of rivalry along such lines between private and official forces. Our patrol associations seem so far to lead the field in training specialists in fire work. They can probably furnish the most efficient handlers of large crews, the most experienced slash burners and the best collectors of evidence in criminal cases. The forest service is hampered in this by the multifarious executive demands upon its members. On the other hand it has led in perfecting mechanical devices and in some districts, probably, in organization of system. Publicity devices to educate the public began with the associations, but the government seems to be conquering its dignity pretty well and entering this field bravely. I think it will soon be the same in the other fields; that the systems will become more and more identical, especially as co-operation becomes closer.

To many of you, any description of association patrol systems is an old story, but I have been asked to outline its principles and its latest developments for the benefit of our visitors, and speaking generally for all Coast associations.

In selecting men, we take into consideration the character of the district to be covered. Where there is active logging and the menace is from such operations, a man familiar with this class of work and its necessities is far more successful. However, in a district where the menace arises from the activity of ranchers in clearing land, a man familiar with the farmers' side of the question is employed. Both are familiar with the best methods of burning slash, as the removal of this menace at the proper time is most to be desired. In the more remote timber districts experienced woodsmen are employed, familiar with all roads

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and trails, camp sites, fishing streams and frequented places, and with the methods of hunters, campers and fishermen. All must be in sympathy with the work and usually have had previous experience. They receive their appointments not through political or personal influence but on account of their qualifications for the job, and are kept as long as they make good. When possible, we prefer to have our members turn over to the association old and tried employees, like cruisers and foremen, for the leading positions.

A patrolman reflects the attitude of the state and the association towards the enforcement of the laws, so to be successful he must be fair and impartial in his administration and conduct himself personally in a manner to command the respect of those with whom he has to deal. In posting notices, distributing publicity matter, issuing permits to burn, calling attention to dangerous slashings and unusual hazardous conditions, advising as to their disposal or protection, he bears in mind that his function is to instruct and win friends for the cause, as well as enforce the law, thereby getting the sympathy and co-operation of all classes in the work.

Patrolmen and fire wardens have gradually become familiar with the fire laws under which they are operating, and with their interpretation. They have also learned the value of evidence, what is competent and incompetent, and how best to present it to the proper officer for prosecution. Some associations have accomplished this by employing one or more men with special experience in this line of work, and as inspectors they travel around among the rangers offering advice and suggestions, and when a violation of the law is called to their attention they assist in working up the case. Much has been accomplished in this direction.

In the past many cases failed because of insufficient evidence although conviction seemed certain and there was no question as to the violation of the law. During the last year heavy fines, and in some cases terms of imprisonment, have been imposed where formerly the cases would have been dropped or only a nominal fine imposed. This also goes to show that the work of the Western Forestry & Conservation Association in arousing public sentiment is bearing fruit and the campaign carried on by this association should be encouraged and the field enlarged.

Another feature of association work is looking out for trespass. Maps showing accurately the lands belonging to contributing members of the association are placed in the hands of patrolmen and fire wardens and those not familiar with such work are instructed by the inspectors or chief fire wardens as to boundary lines, corners, etc. Illegal cutting of timber is reported at headquarters immediately and the owner is notified. This feature of the work has been very valuable during the past year and should be developed. Some associations also make detailed and accurate reports of fire damage to non-resident owners, so the latter may take advisable steps for salvage, look after taxation changes, etc.

There has been a wonderful improvement in the attitude of logging operators toward fire work. Rangers, inspectors and state fire wardens are welcomed at the camps and mills, and ideas exchanged, suggestions made and acted on, showing a sympathetic co-operation in the work. This has resulted in organizing experienced slash-burning crews who are experts in their line of work. These men are started at work a month or two before the fire season commences and are often kept on long after the close of the season. The result is that large areas of dangerous slashings have been gradually cleared up.

Three Forces in the Field.

In the state of Washington there are three forces in the field: the forest service on the National forests; the association men working under a chief fire warden and inspectors; and the state fire wardens, working under the state forester with a force provided the state by the Federal Government under the Weeks Law appropriation to protect watersheds. The state forester and the chief fire warden of the Washington Forest Fire Association confer together in the selection of all these men except the National forest force, and all have state authority. Daily reports are made out and sent in at frequent intervals showing what the men are doing and how they cover the ground. Instructions are sent out from headquarters to each man in the field, making suggestions as to the best way to handle the work, urging the inspection of logging camps and railroad equipment to see that proper safety appliances are in use to prevent the spread of fire, urging the burning of slashings during safe periods and urging delay or extreme caution during dry periods, calling attention to the necessity for close inspection of slashings before permits are given, and insisting on the cutting down of snags and the preparation of fire breaks at proper points. These instructions also contain suggestions for harmonious work with operators, ranchers, those engaged in clearing land, and all classes frequenting the forest; encouraging the rangers in their work and keeping up their interest in the movement. These forces all co-operate with the Federal forest service near forest reserve boundaries, and, where it seems advisable in order to avoid duplication of work, actual division of patrol territory is arranged, each acting for the other on agreed areas.

The Oregon and Idaho systems are somewhat different. Instead of one association covering the entire state, associations are formed in different counties or watersheds. The timber owners get together and select the best available woodsman, usually one of their employees, and recommend him to the state authority for appointment as district fire warden. In Oregon the state forester pays this man's salary while the association appoints rangers to work under him at its own expense. In Idaho the state bears a certain share of all expenses. This combined state and private force is strengthened by Weeks law men supplied by the Government, and in Oregon the counties often furnish a man or two. All work together under the district fire warden. The result is an adequate force of competent patrolmen, avoiding confusion by being under one head but paid by different agencies so that the expense to each is small.

In the past, when all these different agencies were working separately, much territory was left unguarded and much had duplication. Lack of acquaintance and confidence in each other's competence, as well as actual conflict of authority, led to suspicion and friction. Every time this resulted in mutual criticism, the public lost a certain amount of faith in all of us and the effect of our educational work was reduced.

Now all this is changed. Everyday working relations between timber owners, state forest officials, and the federal service have brought about not only less politics, friction and impracticable ideas on all sides, meaning cheapened efficiency for all, but also a friendliness and mutual confidence that has a pronounced effect in bettering every condition of forest industry. The public has confidence in this harmonious work. It accords us all credit, instead of discredit, because it sees us allied unselfishly for public good.

And another result of far-reaching importance is manifest. We all foresee increasing participation by the state in forest affairs, and the only reason we do not welcome it is fear of political domination which may sometimes place us under unwise policies or incompetent officers. Co-operation is solving this problem also. Very few public officials in charge of forest work want it anything but competent and practical. When they stood alone against the politician they had little option but to follow his dictation. But as soon as we afforded means by which they could utilize our help and we could give this help in a clear, broad way, not coming from any individual with only his own end to serve, public forest officials came to realize that here is their strongest backing. They confer with us about legislation and about the selection of state wardens, or sometimes leave the latter entirely to us, because they know we want nothing but efficiency; that we can and will help them to better results and a better record than they can get in any other way. I believe this will hold good anywhere; that if lumbermen will organize to join hands with the state sincerely, seeking not to obstruct but to help, the state will soon gladly accept their technical and local advice in building up a system and a personnel which

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will be practical, competent, and fair to all concerned. It has certainly resulted with us already in getting better forest laws and in getting woodsmen, instead of the dependants of politicians, as the nucleus of that trained force which in preface I said marks the evolution of efficient patrol. (Applause.)

The same topic was discussed from the official standpoint of the British Columbia forest service by R. E. Benedict, of Victoria, formerly in the United States service but now in charge of the province's fire organization. A feature of his talk was a frank invitation to British Columbia lumbermen to follow the example of their brothers in the northwestern states and help his office get a competent ranger force and practical policies.

MR. BENEDICT'S ADDRESS.

Before entering on the detailed discussion of the subject of patrol efficiency, I think it will help if I describe the conditions as regards ownership of timber land and the position the Government holds with respect to timber lands in British Columbia, so that you may have a basis for comparison.

The Province of British Columbia was originally a Crown Colony, and when it entered into confederation it was given title to all the lands within its boundaries, just as Texas entered the Union with complete title to its lands. The government of British Columbia disposed of a large portion of its timber lands by granting leases and licenses for the timber alone, the government retaining title to the land and also a financial interest in the timber of 50 cents per thousand to be collected when cut. These timber lands amount to about 10,000,000 acres, and are well scattered over the southern half of the Province. There are, of course, vast areas of timber lands, mostly second growth or burned over land, still belonging to the government. The situation is as if in the state of Washington the state held under lease the valuable timber lands now owned in fee simple by the timbermen, and also owned all the lands in the National forests. Then suppose a state forest department which collects the rentals and stumpage, royalties and a fire protection tax of a cent an acre, and is in charge of a patrol and fire fighting force, and you will have the situation which exists in British Columbia. In all the five states represented in your association failure of the overnments to make adequate provision for the protection of your timber, no matter how highly you are taxed and regardless of the duty of a government to protect the property of its citizens, has forced the owner of timber lands to provide his own protection for his property. Discovering that for each owner to protect his property was wholly impracticable, you have everywhere formed co-operative fire protection associations, thus obtaining far better protection at greatly lessened cost.

Now, in British Columbia the lease and license holders naturally look to the government, since it has such a large financial interest in the timber, to organize an efficient patrol and fire-fighting force. While some individual limit owners have seen fit to provide special protection for their limits, there has been no move as yet to form associations and do the work which it is the duty of the government to perform, and I need hardly add, the officers of the forest branch hope that there will be no occasion for the formation of just such associations.

There have been criticisms to be sure and just ones, but at the same time it is felt that the lumbermen have failed in a measure to give that encouragement to establish an efficient patrol force, as should naturally be expected from them; which brings me back to the subject of this discussion.

In my opinion the one thing which is most badly needed in British Columbia at the present time to insure efficiency in patrol is the assistance and support of the lumbermen. By this I do not mean the support of the individual lumbermen; I think we have that, but the powerful backing of the lumbermen as the united representatives of a great industry. Mere criticisms of the methods or personnel of the patrol force will have little effect unless they are followed up by the efforts to see that the faults are corrected. This can only be attempted by a strong body and the results to be obtained, the protection of the very source of the lumber industry, certainly justify the lumbermen in concerted action. Therefore, while I think there is no opening in British Columbia for fire patrol associations, such as have been formed in the Northwest states, I do believe that there is great need of the united action of all the lumbermen and limit holders in British Columbia to see that the government selects the best men available for patrolmen, expends the fund paid by the lumbermen in an equitable way, and adopts all the measures and methods which experience in other timber regions has shown to be most effective in preventing and suppressing forest fires.

Now, as regards the details of patrol to prevent and discover fires and of the methods to fight fires I do not wish to discuss so much what has been done in the past as what is planned for the future.

First of all comes the kind of men to be selected for wardens or patrolmen. The ideal should be, I think, one who is thoroughly familiar with woods and farm work, who is energetic, capable of and willing to endure severe work, and who possesses the knack of handling men and of obtaining the good will and assistance of the people living in his district. Such men are difficult to obtain, but adequate protection is out of the question until the members of the force approach such a standard of qualifications.

Next comes the size of the districts to be handled by one man. The present area of the warden's districts in British Columbia is over a half million acres. For one man to patrol such an area is, of course, impossible, and while lack of funds will prevent the reduction of the districts to a proper area, it is hoped that next year one man can be furnished to every four hundred thousand acres. It will also be possible to appoint extra patrolmen during the most dangerous seasons.

Quick means of transportation and communication are of the utmost importance. In all districts provided with roads and trails the wardens will be provided with horses, and where water transportation is possible launches and canoes will be furnished. The Province is greatly lacking in telephone lines, and plans are now under way to build lines into the districts where they are most needed. Some money will also be available for the construction of trails into at present inaccessible regions.

In the past a serious difficulty in handling fire-fighting crews has been the method of payment, requiring the laborer to go long distances to get his time sheet. It is planned next year to give each divisional warden a deposit of several hundred dollars so that the men can be paid on the spot.

A number of loggers assign employees during the dangerous season to patrol work. All such men, and possibly one in every camp, should be appointed fire wardens to serve without pay. This plan would, I think, add greatly to the effectiveness of the patrol by these employees.

My time has now expired, and I will close with the statement that I believe an effective patrol system is made up one part organization and two parts co-operation between the patrol force and the lumbermen and permanent settlers. (Applause.)

Discussion.

The proceedings being somewhat behind schedule time, there was little attempt to discuss patrol work in further detail, although the veteran D. L. McKay from Portland, of the Christian Mueller Lumber Co., enlivened the meeting as he did last year by an eloquent statement that success in fire prevention is chiefly a question of spending money. After referring in vigorous language to owners who let others pay the cost of fire work, and to agents who deprecate co-operative patrol in order to magnify their own positions, he testified that these retarding influences were rapidly diminishing and that in Crook County, Oregon, where he is interested, every owner now comes to the front and

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pays his share for good men and good service. "You may carry some things in these conventions a little ahead of us old lumberjacks," concluded Mr. McKay, "but in others we may solve the problem a little quicker than you would by oratory and parliamentary courtesy. Once in a while what the timber owner needs is to have his attention called to conditions and to his duty in old-fashioned forcible language. The answer to most of your problems is to spend money enough to do the job right. That's the way we solved them in Crook County."

PROVEN PRINCIPLES IN FOREST LEGISLATION

C. S. Chapman, of the Oregon Forest Fire Association, presented the principles of framing, passing and enforcing laws for protection of forests from fire in the following comprehensive paper:

MR. CHAPMAN'S ADDRESS.

Gentlemen: Considering the similarity of conditions in many important respects, and the great variation of our state laws in their fundamental policies, it is necessary to conclude that all cannot be of the same degree of excellence. It is also noticeable that variation is greatest, not in those details which do apply to local conditions, but in broad administrative policies that local conditions affect least.

No state confines its legislative influence within its own borders. The bad precedents a state establishes are almost as likely to be quoted as its good ones when others have forest controversies before their legislatures. The handicap or encouragement given forest interests in one state also affects, through competition, the forest business of other states.

While conditions are exactly alike in no two states and there can be no such thing as an ideal law universally applicable in every detail, there are certain general principles susceptible of universal application just as there are mistakes that all should avoid.

First of all a law should be so framed as to keep those who carry out its provisions from being encumbered with political obligations. This point needs no argument.

To insure this, however, is not such an easy task. If the state forester is the appointee of a state officer, forest work will be stimulated or retarded, and the officer in immediate charge given free hand or hampered, according to whether his appointment is made with a view to political advancement or in the interest of the people. So under such a system, the usual one, you may have good or bad results. To say the least, it is uncertain. The same criticism, though justified to a lesser extent, applies when the forest officers are appointed by a board which is in turn appointed by a state official.

Oregon's Plan Feasible.

So far the most feasible plan devised for controlling the appointment of forest officials is that adopted in Oregon. This plan, which was insisted upon by Mr. Allen, though opposed by many on the ground of policy, is to have a state board of forestry appointed by the governor from representatives of each of six unselfishly interested organizations, or institutions, named in the bill, these organizations through their proper committees to recommend the men they wish to have serve on the board. The obvious advantage is that those most interested in good results have the making of the state policies and the appointment of the officers who will put them into effect.

Next to safeguarding against disturbance from politics I would place the independence of the forest work as a state institution. By this I mean that the forest activities of the state should not be subordinate to or only a part of a large movement.

We know that forestry, fish and game laws have in some states been administered by one commission. In some cases a general state conservation commission has charge of all work which can be placed under the head of conservation. Such a plan serves, as I see it, only one good end: lessening the number of state commissions. The drawbacks cannot be so easily enumerated. First of all, a commission with a wide range of subjects to cover is usually composed of men each of whom is experienced and especially interested in only one of its functions. The result is that each subject is handled largely by one man and the benefits derived from having difficult points passed upon by several people, all intimately acquainted with the subject, are lost.

Energetic Commission Needed.

Again if the member of a general commission who represents forest matters is energetic, that branch of the work may flourish, but if he is not the reverse would certainly be true. Perhaps, however, the principal objection to handling forest matters (and this applies equally to any other related subject) through a general commission, is that lack of wisdom, or action contrary to public approval, relating to any branch is almost sure to react unfavorably on every branch. Nor do I believe that in the long run a general commission will receive such recognition financially for each branch as where each is handled independently and stands squarely on its own merits before the public.

These two things, freedom from politics and independence of forest work from other matters, appeal to me as the prime things to be aimed for in state forest organization.

While a law should provide for fire fighting and fair distribution of its cost, and, of course, for punishing guilt, all this should be subordinate to the highest efficiency in patrol and in preventing carelessness. Any law that fails to provide clearly and boldly for patrol, while full of devices to make some one pay fire fighting costs that might be obviated, misses the main point of all—that we don't want the forest burned no matter who pays for it.

To get prevention, the law must encourage co-operation between those interested. No purely state machinery can patrol adequately without excessive cost, nor should the owner be entirely relieved of cost. No device for compelling the owner to stand all expense will work, even were it not also unfair, for there are areas where his interest is not sufficiently compelling yet where public good demands protection. Moreover, state aid tends to increase, rather than decrease, private effort. Experience has proven nothing more conclusively than that where we come nearest to having government, state, county and timber owner bear the cost jointly on a fair representative basis, under working relations that tend to mutual confidence and understanding, there is the greatest total effort for public good, the greatest economy and efficiency, and the least forest destruction.

To encourage such co-operation, the law should be clear in permitting the state to expend funds jointly with other agencies, yet not too specific as to method. We cannot forecast future developments or changes, and detail of system based on today may hamper us tomorrow. Flexibility may lack in safeguards against poor administration, but it is also essential to the best administration. It is particularly dangerous to attempt to specify administrative detail involving expenditure. Indicate functions and responsibilities, but do not attempt to legislate them too finely. To do so raises the legal presumption that details not covered are disapproved, and controllers or attorney generals feel constrained to disallow in contingencies unprovided for only because unforeseen. This has caused much trouble.

On the other hand, punitive sections which become part of the criminal code should be exceedingly clear and exact. Doubtful intent, slipshod wording and unconstitutionality frequently result in wholly unnecessary confusion. I cannot emphasize too strongly the need of studying all such sections thoroughly from both a legal and a prac-

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tical field standpoint. These things which will work should be expressed beyond evasion and those which will not work should not be imposed accidentally. Guard carefully, also, against ineffectual repeals.

Regarding the foregoing as practically axiomatic principles, there are countless details of locally varying importance or concerning which there is still fair controversy. For example, opinions differ as to whether penalties should fit the gravity of the offence, or be kept low enough to avoid the necessity of superior court trial with its inevitable delay. I favor prompt trial in the community, when smoke still reminds people of the fire danger and the witnesses have not disappeared, even if the punishment be light. Moreover, it is easier to convict if the consequences are less severe. Fines should go to the county, not to a state forest fund, for the latter plan requires the county to bear the burden of enforcing the laws without recompense and tends naturally to resentment and non-enforcement. I like the Oregon system of making the laws governing disposal of slash, cutting down snags, clearing rights of way, etc., exceedingly strict, yet providing that the state forester may suspend such restrictions when or where public safety so permits or requires.

Compulsory Slash Disposal.

Compulsory slash-disposal is a hard question to cover in forest law. This is partly because of differences of opinion regarding the way the slash should be disposed of, and partly because loopholes of escape are hard to prevent. Undoubtedly this matter should be covered along as broad lines as possible, leaving wide discretion to the officer charged with enforcement of the law. Personally I am in favor of requiring yearly burning by the operator, but providing for the state's doing the work at his expense if he fails to take advantage of the opportunity which generally comes either during Fall or Spring. I believe it is a proper function for state fire wardens to assist owners in burning slashings, and that no work these wardens could do would go farther to help keep down fires.

The desirability of burning permit systems is one regarding which I believe there is general consensus of opinion. It is a most delicate project constitutionally, however, and may easily defeat its purpose if worded in a manner to impose unnecessary hardship. The policy under which issuance of permits is regulated is also one for serious consideration. More than one forest law has been attacked because ranchers found unnecessary difficulty in clearing land under its permit section. There is often a tendency on the part of wardens, prompted by the commendable desire to make a good showing in keeping down fires, to refuse burning permits if the season is at all dry. While undoubtedly great care should be exercised in issuing permits, it must be remembered that Summer months are the ones when burning can be cheaply and effectively done, and it appeals to me as good policy to issue permits when possible even though some trouble to see that they are not abused may be involved.

Enforcing our laws and making them cover the various unexpected cases which arise is no easy matter. I believe, however, there is practically but one trouble which does not lie within the ranks of those interested in strict enforcement. This is lack of support by district attorneys, justices of the peace, and trial officers generally. For the most part these officials are not lacking in sympathy so much as in understanding, and educational work among them would certainly go far to make it easier to secure convictions.

Similarly the right kind of public education is necessary to reduce the need of prosecution. I believe it has generally been the policy of officials engaged in enforcing forest laws in the Northwest to endeavor in every way to prevent people from breaking the laws rather than be chiefly concerned in catching offenders. This, I believe, is a policy which has done much to make these laws popular, and has enlisted the interest and support of nearly every right-thinking citizen.

To sum up the essentials in drafting and enforcing forest laws, I believe:

First: That the only effective law is one giving the widest latitude to a governing board to act in any emergency.

Second: Officers engaged in carrying out the law must be kept out of politics.

Third: Ample provision must be made whereby the state can co-operate with timber owners and the Federal Government in protection matters, for without such co-operation duplication of effort is inevitable.

Fourth: The forest work should not be tied up to other movements but stand on its own feet and make good or fail on its own merits.

Fifth: Law enforcement should be rigid, but through wide educational work all citizens should have ample opportunity to know the provisions and penalties of the law.

Law Should be Broader.

There is one other view which many may not agree with, but which I feel certain time will prove correct. Here in the Northwest we are principally interested in fire protection, and other matters dealt with in our laws are incidental and generally of little moment to most timber owners. I firmly believe that our laws must be much broader; that our state forest work must, if it is to assume the importance the timber industry warrants, embrace assistance to those in the treeless sections, provide for state-owned forests and the acquisition of land for this purpose, and, in a word, go outside the field of fire protection into that of forest management. The timber resources of the Northwest warrant every protection which the various states can give them. This state duty, however, extends beyond the realm of protecting our standing timber. The state in addition to this should already be looking to the perpetuation of the timber industry when the present standing timber has been removed.

To my mind there is a very practical purpose in enlarging the scope of our states' activities in forest work. Each year we have to urge appropriations; in other words, prick the state up to the performance of its duty. But if our forest work involved more up-keep and protection of valuable state property, there would be less hesitancy about apropriation, so to my mind the advance we make from now on in securing from the states a reasonable share of what they should give to protect timber, must come largely through widening the scope of our state forest work and consequently its public support.

Just one word also regarding tax laws. While it may be unwise to handle the matters through the same agencies, every man interested in forest protection is also interested in securing equitable forest taxation. For a long time fire protection and conservation were talked of in a vague way, little practical work being done. Then forest protection was taken up by actually putting men in the field and finding out to what extent fires could be kept out. State legislatures were confronted with fire laws to pass and good arguments why they should be passed. This meeting shows what has been done by concerted effort.

Now for a number of years forest taxation has been discussed, by timber owners, foresters, economists and general conservationists, but little practical work has been done to right matters. It seems to me possible that were the same attention given the question of forest taxation, along lines somewhat similar to those employed to advance fire protection, we might find that progress could be made here also.

In the meanwhile we have to make the most of the forest laws we have. In this connection I have to repeat largely what I told you last year.

We should utilize every provision for co-operative patrol and fire-fighting, testing their strength and discovering desirable changes.

The state's police power, which the rest of us cannot exert to equal advantage through delegation, should be developed, both to provide more officers especially trained to avert violations and apprehend violators and to furnish expert legal help in prosecutions where county attorneys are incompetent.

We should develop similar expert facilities in our associations to assist the state and act where it does not.

There should be more collection and exchange of information on past cases to help all of us deal with offenders.

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We should delegate and assist competent committees or persons to analyze state laws and advise us for or against changes.

The day for leniency is past. Swift and sure trouble should descend upon every violator, in or out of the lumber industry, and systematic publicity be given every prosecution.

We have been wasting too much effort putting out unnecessary fires. It will pay to divert more of our attention to the legal machinery for reducing them. (Applause.)

Mr. Chapman was followed by E. G. Ames, of the Puget Mill Co., Seattle, whose address on the subject of needed legislation in regard tax question was an exhaustive treatise on the present abuses and injustices in the taxation of timber lands. Mr. Ames illustrated his argument with excellent charts to prove that his proposed system of taxation would secure a similar amount of taxes in the final analysis as t he present system, and work no hardship on the timber owner, who was protecting this timber for future generations by fire protective methods.

MR. AMES' ADDRESS.

The word tax in its most extravagant meaning implies tribute. For instance, a tribute as demanded by a victor as indemnity for extraordinary expenditure in case of war. The word also suggests the idea of burden. Taxes are a portion of the burdens of land and labor, energy and brains, based on an equitable assessed valuation levied and collected by authority, and placed at the disposal of the nation, state, county or municipality, for the protection of life, liberty, and property, and to provide comforts and conveniences, and for amusement, pleasure and education of the masses, made necessary by our highly developed civilization.

The United States Government depends on what are known as "indirect taxes" for its income, such as imposts, customs and duties on imports and exports, for the protection of home industries; also on excise taxes, or internal taxes, such as duties on commodities of home production, manufacture, sale and consumption, an example being the internal revenue tax on alcoholics and tobaccos, and licenses to manufacture and sell such commodities and again, on a corporation income tax, which, under late court decisions, although assessed direct to a corporation on its net income, is adjudged an indirect tax, inasmuch as the corporation that pays the tax charges it up against its income as a matter of expense, increasing the cost of doing its business and with the intention of collecting the same from those with whom it does business.

The state, the county and the municipality derive their incomes from direct taxes; that is, individual tax on property of all kinds, personal and real, based on valuations comparatively fair, so that the burden may be as equally divided as possible; from inheritance taxes, from capitalization tax, or head tax, or poll tax, levied for general purposes, sometimes levied for a special purpose, as a road poll tax, and from licenses for doing certain kinds of business, and engaging in certain kinds of trade.

Taxation.

Taxation is the method or system of assessing, levying, collecting and distributing taxes, and to be just and result in an equitable distribution of the burden, must be based on commercialism.

In the early days of settlement in the New England states, the colonists claimed to be free from the domination of any government on earth; in fact, they claimed to be independent communities. Manufacturing, trade and commerce in those days had not been developed, and every settler was a farmer. He marked well the boundaries of the piece of land which he had squatted upon, which had been allotted to his particular and individual use, and depended upon that land to provide a living and the industry of his family to produce everything that was needed by them.

As time went on it became necessary to combine for the mutual protection of life and property, and the result was colony organizations, those in charge serving without remuneration, or if paid at all the remuneration was insignificant, the leaders of the community giving their time for the common welfare.

The New England town meeting was created, when early in the spring, usually the last Monday in March, the community would assemble at some place and listen to the reports of the authorities as to how the funds of the community had been disbursed; as it were, an accounting of their stewardship for the past year. These reports were listened to with attention, and criticised in open meeting. Then a new set of officials were selected, by ballot, or often by yea and nay vote, to look after the affairs of the community for the succeeding year.

The budgets were carefully scrutinized, and estimates cut down to meet the ideas of the majority, and you may be quite sure that every settler in the locality was present at the town meeting, an interested party; he knew what had been done in the past, and had very definite ideas of what ought to be done in the future.

As it was necessary to raise money, and the tax was practically all paid by the settlers or farmers, the time for the determination of values for assessment purposes was fixed, without exception, in the early spring, usually about the first of April, for the reason that at that particular time, owing to the season of the year, the lands had not been plowed or made ready for the sowing of the crop, and consequently the crop had nothing whatever to do with the value of the land for assessment purposes.

A board of assessors was usually elected at the town meeting, and a few days after they qualified, and went to work and made up their assessment roll from lists handed in by the settlers, and from positive knowledge of the holdings of every individual in the community. This board of assessors sat as a board of equalization, and when values were finally determined upon they were totaled, the budget applied to the assessed valuation, and the rate of levy determined. The assessment and tax rolls were made up and completed, and by the first of July (a custom still prevailing in New England) the completed assessment roll was in the hands of the treasurer, and the taxes are payable and subject to 7 per cent discount for July payment. Those not paid in July are subject to a smaller discount of 4 per cent if paid in September. If not paid in September they become delinquent on the 31st day of December, and you may be sure that under these conditions the taxes for any particular year are assessed, levied and collected within the short period of ten months, there being only now and then occasional delinquencies.

Let us contrast with this simple system of taxation the system in vogue in Western Washington at the present time. Taxes are assessed as of value of March 1st. The assessor, a county official, has already been elected at the November general election, four months previous. He begins work in his office at the earliest possible date the law will permit, and with a large force of deputies he sets to work making up his assessment roll, and establishing his values. At a definite time he reports to the Board of County Commissioners, who sit as a board of equalization. Then the report comes back to the County Commissioners, who determine the amount of the levy from the budget, and from the assessment made against the county by the state, and for municipal purposes. Then it goes to the county auditor, who extends the levy and completes the roll. He then makes up a duplicate roll, and places one copy, which has been duly certified to, in the hands of the treasurer. It is then possible to pay taxes the first Monday in February. If paid before the middle of March a cash discount of 3 per cent is allowed, and if not paid previous to the 31st of May taxes become delinquent. The taxpayer has the right to pay one-half of his taxes previous to May 31st, and thereby extend the time of delinquency on the balance until November 30th. In all probability you will find a long list of delinquent taxes, and a hired representative of a delinquency tax certificate speculator holding on to the door knob of the county treasurer's office for days until the proper hour arrives when the prin-

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cipal can take his place, and tender his check to the county treasurer, sometimes in blank, and at times for thousands of dollars to apply on tax delinquencies. Certificates are issued to him for the amount of unpaid taxes, large penalties, and exorbitant interest charges. Under this system it is possible for the delinquency certificate speculator to obtain title to valuable property for the amount of the taxes, interest and penalties permitted.

Under this system you will observe that the county authorities are working on taxes for at least twenty-one months; in other words, it is twenty-one months from the date assessment is made until they are finally paid without the liability of their becoming delinquent on the roll. I think you will agree with me that this system must be most expensive, and a long drawn out, unbusinesslike operation.

Single Tax.

During this generation we read much of a new theory or system of taxation, known as single tax, which is best explained as being a tax on a single object, such as capital, income, or land, and as usually discussed, is applied only as a land tax.

Mr. Henry George in his Single Tax platform describes single tax as follows:

"Single tax, in short, would call upon men to contribute to the public revenue not in proportion to what they produce, or accumulate, but in proportion to the value of the natural opportunities they hold. It would compel them to pay just as much for holding land idle as for putting it to its full use."

Which means that the professional man, merchant, banker, publisher, printer, manufacturer, building owner, transportation companies, etc., would not participate in the burdens of taxation, which would fall on land alone.

Commercialism and Business Management.

"The ability of a country to pay taxes must always be apportioned in a great degree to the quality of money in circulation, and to the celerity with which it circulates." That was the idea as expressed by Alexander Hamilton during the early experience of our Government. That is commercialism. In other words, if there is no business, no trade, there is no money in circulation, and money consequently cannot be obtained readily for the purpose of liquidating taxes, an item of expense to every man's business, which means that taxes should not be so burdensome as to interfere with economical business management, and production at a reasonable cost. The expense has to be borne by the consumer after all. The more the expense the more the cost, and the more the cost the more the consumer must pay, and allow the producer a fair profit, or margin on his investment and operation.

In order that taxes may be reasonable, the business of the nation, the county and the municipality must be conducted along economical and business lines. Is that the case? If not, why such extravagance in the conduct of public business?

One-half of the taxes paid to the state, the county and the municipality is expended for schools and roads. Schools are a necessity, and it is proper that the boys and girls should be properly educated for their particular place and position in life, but is it not true that extravagance in expenditure of funds for public schools often prevails?

Good roads are a necessity to the development of the country, but are we not building better roads than we can afford? Is the money properly expended, and is it not true that any practical man would be able to build the same class of improvements for himself at very much less cost than the expenditures actually being made for such purposes?

If you will examine the reports of expenditures of our public officials of their various departments, you will find that the assessor's office, the county commissioners', the auditor's office, the treasurer's office, and the legal department's expenses, properly chargeable to the assessment, levying, collection and distribution of taxes, are often along most extravagant lines. There must of necessity be some competent clerks in charge of the different departments, but as a rule positions and clerkships are awarded as a reward for political activity. Incompetent clerks are often employed who do poor work, labor short hours, and do not give fair return for their salaries.

If these things could be looked into by every taxpayer, or if every citizen would take the interest in public affairs that they formerly took in the New England town meetings, things would be different. The trouble is that the average man does not investigate; he is too busy with his own affairs to look into the administration of public business, notwithstanding it results in undue expense to his private business in the way of taxation.

Exemptions.

In the old New England town meeting it was not unusual for a vote to be taken, either at the annual meeting, or at some meeting called especially for the purpose of voting an exemption of taxation to some investor or manufacturer who with exemption from taxation say for ten years would build a factory and provide employment for the unemployed, and make a market for the products and natural resources of the community. That was a business proposition; everybody knew about it, and when such things came up there was seldom any opposition.

The legislature of this state some years ago passed a law to assist those who wished to engage in fruit raising, and the establishing of vineyards and orchards, by exempting from taxation the trees and vines and plants, so that in determining the value of the orchards (for assessment purposes) it might be based on land nominal value alone. This presumably was for the reason that the men who set out an orchard would have to wait five to seven years before he would have a crop and get a return. At the present time these orchards are producing big cash returns for their owners yearly, still those trees which have resulted in establishing big cash values for the land itself, are not subject to taxation, and orchards which have a value of $1,000 or more per acre are seldom valued for assessment purposes at more than 10 per cent of what they can actually be sold for in cash.

Taxes on Growing Timber Lands.

In this Great Northwest we have the most extensive growing forest on earth. Its age is from 400 to 4000 years. "Our great first crop" once harvested will never be reproduced. The theorist dreamers preach and write of conservation, but often oppose the very laws which would make conservation possible.

I have seen the taxes on wild lands, valuable solely for growing timber, increase from less than 4 per cent per acre to in some cases over $5 per acre per annum. I have seen the average annual tax in timbered counties in Western Washington increase from 4c to 25c and to 80c per acre, which is about the average of the 1911 taxes paid in 1912. Seven years ago the average tax was 23c per acre; at the present time the average tax is about 80c per acre, and the chances are that the rate of taxation on growing timber lands will be materially increased for the year 1912.

In eleven counties in Western Washington, covering 3,382,000 acres of timbered lands, the valuations for 1911 were in round numbers, $59,000,000. According to the assessed values of 1912, for the same counties, covering the same acreage, the assessed valuation will be $75,800,000, an increase of practically $16,800,000. In one county, covering some 500,000 acres, the assessed valuation for 1911 was practically $8,300,000. For 1912 the assessed valuation for the same acreage will be $15,700,000, almost double, so you will see that the limit of taxation on growing timber has not been reached yet.

From careful estimates which I have made, taking the first cost of the land, adding the actual taxes paid annually, and computing compound interest at 6 per cent, there is no acre of growing timber in Western Washington which has cost its owner less than $50,000. On that basis, figuring interest at 6 per cent, which is $3 per year, plus 80c actual tax for 1911, it cost last year to carry your timber land $3.80 per acre, and on the basis of 50,000 of timber to the acre, which I believe is the average county cruise, it costs about 7 3-5c per thousand feet, board measure, to carry

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timber land, for interest and taxes. Add to that the contributions to the forest fire fund, and the actual cost of cruising, watching, clerical work, etc., and you will find that it will cost over 8c per thousand feet board measure per annum, at the present rate of taxation, to carry an investment many years until the crop is cut. Take your pencil and paper and figure this out with interest for ten or twenty years, and I think you will be astonished at the result.

Explanation of Tables.

I have prepared some tables which I will explain at this time, to show the cost of carrying timber lands at the present rate of taxation of 80c per acre:

(Here Mr. Ames explained and compared the following tables in a manner which does not lend itself to a written report. He showed how a yield tax method, like that suggested by the second table, would work out to the advantage of community and forest owner alike.)

SUGGESTION FOR TAXATION ON GROWING TIMBER. TAXES TO BE PAID WHEN TIMBER IS CUT AND IN ADDITION TO A YEARLY TAX ON LAND ONLY.

Period. of Years.	Per M. ft., B. M.		Total to be paid on basis of 50 M. ft. B. M. timber per acre.	
	Rate per Annum.	Total for Period.	For Period.	Average per Year.
1- 5	1½c	7½c	$3.75	$ .75
1-10	1¾c	17½c	8.75	.88
1-15	2 c	30 c	15.00	1.00
1-20	2½c	50 c	25.00	1.25
1-25	3 c	75 c	37.50	1.50
1-30	3½c	105 c	52.50	1.75
1-40	4 c	160 c	80.00	2.00
1-50	5 c	250 c	125.00	2.50

Conclusion.

Death and taxes are inevitable. Death comes to every individual and everything; it comes but once. After death is dissolution, and after dissolution, what? Only a question of opinion and belief. Taxes come to everybody annually and continuously. After we have paid them for one year we get ready for the next. There is no end to it.

If you will take these tables, apply compound interest to your original cost, add taxes, and compute interest for the next fifty years, I believe you will agree with me that when you draw the line under your column of figures you will add it up and write under the line the word "Confiscation."

The system of taxation in this state is unfair, and is not based on commercialism, and so far as growing timber is concerned, forces the owner to accomplish an early harvest under such circumstances as result only in a two-thirds crop.

If we would have true conservation we must do away with extravagant conduct of public business, and change our laws in such a manner that the necessary burden may be made easier for the taxpayer without loss to the state.

The Timberman of June, 1912, says: "The Timberman believes that the only fair, just and equitable tax for timber is the plan which provides a low annual tax upon the land, and an adequate tax on the timber when cut." I heartily concur, and would add that the state should preserve a preferred tax lien on the land and timber, growing and even after cut into logs, etc., for protection and assurance that the stumpage tax would be promptly paid when the crop is cut off; the state to assume with the timber owner the fire risk, and also participate in increased value on account of annual growth. (Applause.)

1911 TAXES PAID AVERAGE OF 80 CENTS PER ACRE, WESTERN WASHINGTON, ON TIMBERED LAND; INTEREST AT 6%, COMPOUNDED ANNUALLY.

PERIOD. OF YEARS.	RATE: 80c Per Acre Per Annum.			RATE: 60c Per Acre Per Annum.			RATE: 20c Per Acre Per Annum.		
	For Period	Average One Year.		For Period.	Average One Year.		For Period.	Average One Year.	
	Actual Cash.	Cash.	Interest.	Actual Cash.	Cash	Interest.	Actual Cash.	Cash.	Interest.
1- 5	$4.00	$4.78	$ .96	$3.00	$3.58	$ .72	$1.00	$1.20	$ .24
1-10	8.00	11.17	1.12	6.00	8.36	.84	2.00	2.79	.28
1-15	12.00	19.73	1.32	9.00	14.80	.99	3.00	4.93	.33
1-20	16.00	31.20	1.56	12.00	23.40	1.17	4.00	7.80	.39
1-25	20.00	46.53	1.87	15.00	34.90	1.40	5.00	11.63	.47
1-30	24.00	67.04	2.23	18.00	50.28	1.67	6.00	16.76	.56
1-40	32.00	131.24	3.28	24.00	98.43	2.46	8.00	32.81	.82
1-50	40.00	246.21	4.92	30.00	184.66	3.69	10.00	61.55	1.23

PUBLICITY IN PROMOTING FOREST PROTECTION

Modern advertising methods in promoting forest industry was the subject of the paper presented by F. C. Knapp, president of the Portland Chamber of Commerce and of the Peninsula Lumber Co., Portland. Mr. Knapp's address was a masterpiece and enthusiastically received.

MR. KNAPP'S ADDRESS.

Gentlemen: In assigning to me the subject "Modern Advertising Methods in Promoting Forest Protection and Forest Industry," it was evidently not intended that I should deal with the subject in a technical sense. I am not a publicity expert, and we all know modern advertising is a highly specialized profession. A publicity expert must know something of the printer's trade, must be an artist, a writer and a psychologist. To advertise forest protection and forest industry he must be also a practical forester. Mr. Allen, who is all of these things, has described to you some of the devices that have been resorted to in the publicity work of this association. These specific examples, with many of which you were already familiar, will give you a better idea than I can of the work that is being done.

The dictionary meaning of advertise is "to announce, to publish, to make known." Now, to make known any one thing to all the inhabitants of a country boasting a population of ninety million people is not the task of a day. And yet certain concrete examples will prove to you that it is possible by keeping everlastingly at it, to make known an idea to practically all the English-reading population of the United States.

Sometimes it happens, or is brought about, that a single word of common usage will come to have so special a significance that whenever heard it brings up a train of thought quite apart from its original meaning. Even a change of accent on a single word repeated frequently enough has been known in time to connote a peculiar meaning. Take the word "delighted," pronounce it "Dee-lighted" and your mind immediately pictures two rows of grinning teeth, a strenuous handclasp and any number of other characteristics, according to your prejudices and political affiliations.

This in its widest sense is advertising, conscious or unconscious, intentional or otherwise.

I have only to remind you of one other word, a word that has a very special significance for you

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and me. The word I refer to is the one word that has, perhaps, been most frequently upon the lips of each of us here since the beginning of this conference. It is the word which expresses our reason for being here and the word which forms the keynote in the name of our organization. And yet I ask you to bear in mind that it is less than five years since this word was first used in the sense in which we are now using it. That word is "Conservation."

It is a matter of a little over four years since the word conservation was first used to convey the idea of a movement for practical forestry which should include the preservation not only of mine and stream and forest but of the land itself. In that short space of time conservation has become a household word.

But, unfortunately, while conservation has come to denote in the minds of most, the idea of the husbanding of our natural resources, it may also be said to connote certain false ideas. While there is a general and somewhat vague idea that conservation is and ought to be a policy of national thrift, there is also in the public mind an insidiously false impression that conservation is entirely the business of the government. There is also associated with the idea of conservation an equally false and equally evil-working notion, shared by thousands of patriotic and fair-minded people, that the man engaged in forest industry is unequivocally opposed to the forest official—opposed to and fighting to the last ditch the whole governmental policy of conserving the resources of forest and water-fall, of mine and stream. Now you and I know the falsity and injustice of all this. Men engaged in the timber industries, the sincere government officials and all others who have deeply studied the forest problem know that the preservation of the forest is not alone the business of the government, but is the business of every man. It is the business of the logger and the manufacturer, of the man who builds a house and of the man who makes or even who uses, a match. It is the business of the sportsman, the small boy with a gun, and of the careless traveler who throws a lighted cigar from the window of a Pullman car.

But what I started to talk to you about is what we, individually and collectively, as members of this association, can do and should do to advertise forest protection and forest industry. I wish particularly to dwell upon the privilege and duty that devolves upon us as an association, of putting our convictions and purposes in this matter right in the minds of the public.

Since we are considering the significance of words, do you know the definition of association? The dictionary will tell you that it is "the condition of having combined for a common purpose." Its synonyms are: "consideration" and "fellowship." Thomas Carlyle, a master of English usage, went so far as to say: "You cannot make an association out of insincere men."

I take it then, that we are all sincere men, assuming cheerfully and seriously the responsibility that rests upon us in advertising to the world our sincerity of purpose in this all-important matter of conservation. As "eternal vigilance is the price of liberty" and keeping everlastingly hammering on one idea is the secret of successful advertising, so is continuous refutation of false ideas and eternal repetition of true ones, our opportunity for a successful propaganda of forest protection. So it is up to us, as a body of sincere men, "combined for a common purpose," to make use of every avenue of expression of our honesty of purpose in the preservation and right use of the forests.

We have a gigantic task before us in the eradication of the false theories and unworthy ideals that go to make up the average American's convictions on the subject of conservation.

I have always thought that Diogenes was on the wrong trail; it is not so much the "honest man" that is the rarest among mortals, but the man with an open mind.

We have to fight not only human inertia—which, paradoxically enough, is the strongest force in Nature—but we have to combat prejudice and uproot tradition.

We are a whole nation of prodigal sons. We are not only wasteful but we glory in our wastefulness.

Thrift is not in our category of virtues.

Indeed, we are prone to look upon thrift not as a virtue at all, but as a makeshift of little people.

Eve was not obliged to pare her potatoes thin and we of the bounteous West have been accustomed to consider ourselves as dwellers in a garden of Eden from whence we could look with no little scorn upon the frugal ways of the New England housewife. But there came a time "when Adam delved and Eve Spun" and now our own day of reckoning is at hand.

If we would stay in our garden of Eden we must not only pare the potatoes thin, but we must plant the parings. We must not only cut the ripe timber with due regard for that which should make further growth, but we must use the slashings and re-forest the hillsides.

The Government, not so very long ago, undertook to compile some statistics on the subject of American wastefulness. A few of the items upon which fairly accurate figures were available were as follows:

Every day we waste one billion cubic feet of natural gas.

The fire loss per capita in America is ten times that of European countries.

We waste $500,000,000 a year in soil operation.

We waste $772,000,000 in losses of income due to industrial diseases, which are largely preventable.

We waste $50,000,000 and sacrifice 50 lives a year in forest fires and have been doing it for a generation.

It has been compiled that for the 33,000,000 wage earners in the United States the waste from all these causes amounts to not less than $300 per year or $5.75 per week for each worker. When we consider that the average wage of the wage-earner in this country is $9 per week, we can arrive at a vague idea of what a saving of all this would mean to the individual worker, translated into terms of human comfort. Add $300 per year to the income of the man who gets but $800 and you make possible for him the difference between a struggle for existence and the joy of living.

Most of us here today, timber owners and lumber manufacturers, know that there is nothing more palpably false than the prevailing opinion among people not commercially interested in timber that the preservation of the forests for the use of a future generation is a matter exclusively for the government to look after. We know that four-fifths of all the standing timber in the United States is owned privately and we know that one-half of all the forest lands in private hands is properly protected from fire. This means that the question, whether the nation is to face a timber famine, is one for the private owner to consider.

Thus it is up to you and me, the members of this association, to correct the false popular impression and to make known everywhere the fact that conservation is not only a policy to which the government is committed, but, in its broadest sense, it means a new national idealism toward which officials, lumbermen and laity alike, are striving.

And so our task becomes the delicate and difficult one of popularizing an ideal. Each of us—associates, confederates, fellow-workers, sincere men "combined for a common purpose," must go back to our several communities and take home to them through all our other varied associations, the lesson that we have conned here together. It is the lesson that is taught to every Boy Scout and Camp Fire Girl, the lesson that should be taught to every lumberman, logger, sportsman, traveler and child—the lesson of personal responsibility for national conservation. (Applause.)

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PRACTICAL FORESTRY EDUCATION

The last address of the meeting was presented by Prof. C. H. Shattuck of the Forestry School of the University of Idaho. Prof. Shattuck illustrated his remarks with an exhibit of western woods which had been subjected to various processes.

PROF. SHATTUCK'S ADDRESS.

Gentlemen: That education which is only theoretical belongs to a by-gone age. Educators along most lines are now striving to make their courses practical. The day is gone forever when those in charge of schools may write over their entrances the old but senseless motto, "Nothing useful taught in this school." The present is an intensely practical age and the things we teach must have a practical value.

Forestry education in America has, from its very beginnings, striven to be practical, and the phenomenal progress of forestry in this country is one of the evidences that it has, in a large measure, succeeded. Yet, many things still remain to be accomplished. In fact, we in the West are as yet engaged largely in the preliminary work of protecting our raw material from the ravages of fire. We are just beginning the great work of harvesting our timber resources, and here we should bring to bear all that study, experience, and common sense can evolve.

The question constantly before those of us engaged in educational work in forestry is: How may the forest school be made most useful to the forests and those who are utilizing their products?

While all forest schools have in a general way the same problems, each locality presents its particular problems which must be met by the schools of the region. Thus the problems of the forest schools of New York or Pennsylvania are quite different from the problems of such schools in Idaho, Washington or California. We of the West must strive to adapt our efforts mainly to Western forests and conditions. Our lines of endeavor may be summed up under three main heads, each of which represents a large and important field. These are:

1. To give courses of instruction in forestry subjects which are especially adapted to Western forests and conditions.
2. To conduct research dealing with Western forestry problems, as in reforestation, utilization, preservation, etc.
3. To carry on educational work with the public.

In considering the first of these, we should observe that until quite recently the opportunities for obtaining instruction in forestry were limited to a very few schools. There is need for more men thoroughly trained in forestry. This statement is especially applicable in considering the forests of the Northwest, where our oldest schools have been in existence but five years and where the forests are very different from any other forests found in this country or in Europe. Consequently, different methods and processes must be introduced or old methods and processes must be adapted to the timber and conditions here found. While it is true that the principles of forestry, like those of any other science, are everywhere the same, the practice must always vary more or less with the locality. It is, therefore, one of the great aims of the Western forest schools to fit young men with a practical training in forestry such that they may in time fill places of responsibility in developing and utilizing our Western forests and in placing them on a permanent basis of profit to their owners.

In other words, we are trying to prepare young men so they can tell us about processes and their costs. What will it cost to build this flume or logging road? Which will we use, and why? What power will we use in skidding our logs and what will it cost? Can we use our slabs, sawdust and stumps? If so, how and at what profit? Where will we find a market for this or that product? These and many other important questions confront the operator and require the most careful consideration. In all operations two items must be considered; the first is the burning item of costs; the second that magic word, too often a myth, which we call profits. We feel that the Western operators will be glad to employ men who can bring to bear on their operations information and methods which will tend to reduce the costs or augment the profits. A prominent man in the lumber business in Idaho told me only a few days ago that he could afford to pay $5000 per year for the services of a first-class logging engineer if he could find one, and I do not doubt that there are those present today who would be glad to secure such a man if he were available. The forest schools of the Northwest are struggling with the conditions of this region and are endeavoring by close contact and co-operation with the operators to so shape their courses of instruction that the young men turned out as graduates may be of real service, because they have a proper grasp of the situation and the information and scientific training necessary to deal wisely with the problems confronting them. Forestry is a broad and deep subject requiring for its mastery years of earnest study in biology, mathematics, chemistry, physics, wood technology, and engineering with a view to their direct application to forest problems as they arise. In addition one must know men and how to handle them. This, in my judgment, is a very important point and cannot be learned in any other school than that of experience. A glance at the lumber and timber values of the Western States, aggregating 1,816,900,000,000 feet board measure, will convince any thinking man that we have in these

Enormous Resources.

These resources are not only for immediate utilization, but may be made productive for all time if we use proper judgment in their present and future management. Our forests should be made to produce their maximum sustained yield, which but a small part are doing at the present time. No other industries have so lavishly used their raw material as have those dealing in wood goods in the United States. They have been the last of all the great industries to employ technical methods in utilization, but we should not blame them for this. The manufacturers of lumber and secondary wood products will utilize every part of the tree as soon as those making technical studies along these lines will show them how it can be done at even a small profit. In fact, they are now using certain species and grades and actually losing money by so doing because they, like the rest of us, abhor the idea of waste, and they more keenly than the general public, feel the need of a closer utilization of our raw materials which always represents potential wealth.

Modern business of all kinds demands a closer utilization of the raw material and a reduction in operating expenses in order to offset the keener competition, and higher cost of labor and materials now than formerly. To meet this demand a new business system known as Scientific Management is being evolved and put into practice in many industries. And those engaged in the wood industry are being compelled, like the others, to do this. They, too, must have greater efficiency in every operation connected with their business. In other words, there must be more refinement of details by the operation of a definite system in every step in the business, from the tree to the consumer, now than there has been in the past.

It is no argument to point to the fact that large companies have in the past operated successfully without these refined methods, because times and conditions are changing rapidly and will continue to change until the wood business, like other large interests, will be forced to use more system, more scientific investigation, and more refined technical methods in all its operations.

The forest schools must train the men who in the future will direct the work of more extensive utilization of forest products. In training them the school must not be far removed from the actual operator and all that he is doing. It must first learn what he is doing, the conditions under which he is operating, and how every part of the work is now being done, after which it may intelligently take up the work of experimentation relative to

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better methods or closer utilization, other uses, new processes, etc. In other words the forest school must begin where the operator leaves off and if carefully guided by his experience, and often by his counsel, may give its students practical training in forestry subjects and may employ science in such a manner as to conduct valuable

Research Work Dealing With Forestry Problems.

The standing of any institution of learning is gauged not only by the courses of instruction which it gives but also by the research which it carries on. Every teacher should be an investigator.

From this it follows that our better schools of forestry will prosecute research in some line and most of them along a number of lines.

Just what particular problems should be taken up will depend on such conditions as:

1. Location and equipment of the institution.
2. Demand for investigation in certain lines.
3. The special training of the members of the faculty.

It is doubtful if any other great resource has so many problems demanding investigation and promising good returns for the money and effort expended as the wood business of our country.

The field of effort is so vast that a mere outline is all that may be presented at this time and this is by no means complete.

1. Protection—1, insects; 2, fungi; 3, wood preservation. 1b, seasoning; 2b, impregnating. 1c, coal tar creosote; 2c, wood creosote; 3c, crude oil; 4c, paraffin; 5c, cedar oil; 6c, other oils.

4a Wood processing—1a, for color; 2a, for odor; 3a, for lasting qualities; 4a, for working; 5a, for reduction in weights; 6a, for by-products; 7a, for hardness.

2. Invoicing—1a, acreage; 2a, species; 3a, yields.

3. Silvics and Measurements—1a, adaptability of species to regions; 2a, rate of growth; 3a, age of commercial maturity; 4a, length of rotation periods.

4. Wood technology—1a, microscopic structure; 2a, timber testing: 1b, strength: 1c, breaking; 2c, shearing; 3c, crushing; 2b, hardness; 3b, elasticity: 1c, bending; 2c, torsion; 4b, other desirable properties.

5. Utilization—1a, sawed material: 1b, new purposes for; 2b, unused species made useful as a result of treating or processing; 3b, new uses for all lower grades; 2a, mill waste: 1b, fuel: 1c, wood; 2c, charcoal; 3c, illuminating and fuel gas; 4c, alcohol; 2b, by-products; 1c, oil resins and oils; 2c, charcoal; 3c, gas; 4c, sugar; 5c, acids and alcohol; 6c, dyes and stains; 7c, pulp and paper; 3a, stumps, laps and limbs (same as mill waste); 4a, non-merchantable species as cottonwood

6. Management—1a, operating methods: 1b, in the woods; 2b, at the mill; 3b, in transit; 2a, valuation; 3a, taxation; 4a, working plans; 5a, laws.

7. Markets—1a, foreign; 2a, domestic.

In a field of research of such magnitude as the one just outlined there is ample room for those who will to engage in the work. We must not expect that one or two laboratories in the East may solve all these problems demanding attention now, in the near future. It would be just as reasonable to expect that the Department of Agriculture at Washington, D. C., could solve all the problems connected with the business of agriculture as to expect that the laboratories now in operation in the East will be able to finish this work in any reasonable time. The raw material in enormous quantities is wasting on millions of acres of western timber land today. This resource represents in the aggregate hundreds of millions of dollars in wages and profits, and the call comes continuously to those in charge of forest schools from the private owner, the large companies, and even the states themselves for help in their efforts to turn this material into something of value.

Since these interests are taxed for the support of schools, their claims upon us for assistance are only just and must be met to the best of our ability. The forest schools realize that this work must be done soon. The fungus rotting the trees, the insect destroying the forest, the stumpy field, the unused mill-waste, and the non-merchantable tree is each a source of losses which may, and must in a large measure, be prevented, and the sooner the better. This should suffice to show something of the possibilities for service by the forest schools in the field of research in the West as soon as suitable laboratories and equipment can be provided.

Educational Work With the Public.

This is also an important field of endeavor for the forest school. In the first place, the faculty of the forest school has more or less work out over the state of a public nature. This consists of demonstrations, lectures, or papers, which its members are called upon to give from time to time on forestry subjects should be published in bulletin form and sent out. Then the results of any experiences which have been conducted by the school over the state together with statistical reports as to the value of the timber products of the state to the people as a whole. In all this work, no pains should be spared to make these papers, addresses, and bulletins exact and as complete as possible, for they are often reprinted and quoted from, thus acquiring rather wide circulation. Few people appreciate the work of the forest school in the way of correspondence with the people of the state. During the past two years this Department in Idaho has written over 300 letters in answer to inquiries relative to forestry and forest products and its correspondence is much heavier this year than ever before. We are encouraging the people to plant trees as wood lots, for wind-breaks, and to beautify their home grounds, their school grounds, parks, etc., and at the present time have growing in the forest nursery at Moscow about three million trees, many of which are now ready for distribution at the cost of growing. In this way we have come in contact with many of the farmers, teachers, civic and women's clubs of the state and they are coming to know about forestry and what it may do for them. We feel that the people of the sage-brush plains of Idaho, as well as those of the timber belt should receive substantial aid from this department as they are just beginning to understand that forestry can help them in very substantial ways to beautify their homes and protect their stock, orchards and buildings and furnish fences and posts. The teachers of the state are glad to know where they can secure trees to use in the observance of Arbor Day. The State Superintendent of Public Instruction has asked for and received a concise statement from us relative to the importance of forestry in Idaho. This has been sent to every teacher in the State and used by them in their school work.

Thus it is seen that we endeavor to teach every vocation in the State in a forceful and practical manner in our educational work.

So far I have assumed that practical forestry education has been carried forward only by the forestry schools in this Western country. This, however, is by no means the case, for only a part of the practical education work which has been done is by the schools. It would be unjust and unfair to neglect the excellent work of our honored secretary, as shown by his reports and writings. We have all felt the stimulus given to practical forestry by his untiring efforts, also the excellent papers by the different members of the Forest Service has given a practical turn to many of our operations. The editors of our lumber and trade journals and forestry magazines have always been quick to publish anything of a practical nature and their pliant pens have done much to advance practical education in forestry.

The close contact with the actual operators and their best men, who so fully share with us their practical experience, have brought those of us who are studying and experimenting face to face with those who are doing things, and we have each felt the strength which comes from this acquaintance and exchange of ideas and have all been quickened and given that impetus which comes from contact and co-operation. The West has it problems in forestry. We are all here today engrossed in the deep study of these problems. We are all endeavoring to work them out in a practical manner. We are learning from one another from time to time, and, what is better still, we are, as we proceed,

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learning by doing. This is the best way possible to secure practical education in forestry or in any other subject, and while we may differ as to the exact methods of obtaining the desired ends, we are all striving honestly for cheaper, better and more refined methods of renewing our forests and protecting and utilizing the enormous amounts of raw material now ready for harvesting in the West. Let us apply the best and sanest forestry methods, holding fast to that which experience has proven to be practical, in all our operations, approaching new methods and processes with an open mind, but cautiously lest we fall into error. And let us remember that forestry is a business and that that business is best which pays best; therefore, that forestry is best which turns into profit every fragment possible to use by the combined aid of study, experience and common sense. We are here in the West in the morning of its possibilities. We should profit by the mistakes of the East and labor together to realize a practical and permanent forestry for this region.

PROF. WINKENWERDER'S REMARKS.

Prof. Winkenwerder, of the University of Washington, was asked by President Flewelling to occupy ten minutes of the remaining time in telling the association what the University of Washington was doing for the benefit of the industry. Prof. Winkenwerder stated that the university had a timber testing laboratory which had done efficient work in establishing the strength of various Western woods and assuring them a place in the commercial world commensurate with their intrinsic values. This was notably in the case of hemlock. Tests on fir and larch had been conducted and others were contemplated. The money expended in thus establishing timber values comes back to a lumbering community a hundredfold.

"We are also conducting experiments in wood preservation. We find that hemlock paving blocks can be treated successfully with creosote in our open tank plant and are arranging, in co-operation with the Forest Service and lumbermen, to lay three or four blocks of hemlock pavement on Pike street, where it will get as heavy traffic as anywhere in Seattle.

"We are experimenting in utilization of wood waste for chemical products and trying to get students to specialize in this line. Its importance is indicated by the fact that a certain southern lumber concern pays a man $15,000 a year for such work and he makes them about $75,000 a year out of refuse and waste from the mill."

At the close of Professor Winkenwerder's remarks, President Flewelling called upon Mr. E. A. Sterling of Philadelphia, who, with Mr. P. S. Ridsdale of Washington, D. C., attended the conference to represent the American Forestry Association. The time for adjournment being then at hand, the several committees presented their reports. These were unanimously adopted and appear on a following page. The report upon nominations having been that the existing officers be continued, President Flewelling briefly thanked the association on their behalf and the conference as a whole for its contribution toward the work for which the association stands.

There being no further business, the conference then adjourned.

BANQUET BY SEATTLE LUMBERMEN

There is an unwritten rule that meetings of the Western Forestry & Conservation Association shall be consistently confined to the business of improving protective methods, without any of the time-honored convention customs of formal welcoming addresses, recognition of dignitaries, or other social excursions consuming time or energy. Seattle lumbermen evaded this rule by concentrating upon the complimentary dinner in the Washington Hotel ballroom on Monday night, between the two business days of the conference, and by making it "something different" from the usual convention banquet.

Approach to the room was through an expanse of unburned slash. Tree-lined walls and tables banked with boughs and salal carried out the illusion of entering a fir forest. A fire warning was posted by the trail. After the guests were seated the room was suddenly darkened and in a moment a forest fire broke out and spread, the effect being produced by cleverly manipulated red lights concealed in the foliage.

After this reminder of the enemy the delegates were gathered to combat, the room was again lighted and the dinner proceeded. Robert B. Allen, of the Pacific Coast Lumber Trade Journal, who had charge of the arrangements, devised a planked steak dinner, the steaks coming from a prize-taking herd maintained by the C. A. Smith Lumber Co., to demonstrate the value of logged-off lands for grazing. The steaks were carved in view of all by a drilled corps of cooks in aprons and caps. A squad of stewards was assigned to the sole duty of patrolling for incipient fires of thirst, with orders to give sparkling burgundy the most complete possible trial as an extinguishing medium. The cigarettes bore the initials of the Western Forestry & Conservation Association. A full orchestra was placed at the disposal of those who were frequently inspired to sing.

J. H. Bloedel, of the Larson Lumber Co., Seattle, was toastmaster. The speakers included Capt. J. B. White, of Kansas City, introduced as "the grand old man of the lumber industry;" President A. L. Flewelling, of Spokane; John R. Toole, of Missoula; T. Frank Paterson, of Vancouver, B. C.; E. G. Ames, of Seattle; C. S. Chapman, of Portland; Coert DuBois, of San Francisco; D. P. Simons, of Los Gatos, and E. T. Allen, of Portland, introduced as "the man who put the 'con' in conservation." The inauguration of closer relations in forest work between western Canada and the western states was the theme of several speakers and the guests heartily drank the toast "To the President and the King."

RESOLUTIONS

The Western Forestry and Conservation Association reaffirms its position on the subject of the establishment of field posts in our national forests during the summer months by Federal military authorities as a reserve fire fighting organization.

The benefits which have been derived by reason of the expenditure of money for patrol purposes in protecting the watersheds of navigable streams through the operation of the Weeks law, justify this Association in recommending that an appropriation of this character be made one of the regular appropriations of Congress.

This Association most heartily endorses the idea of providing instruction on forestry subjects through the medium of the Public Schools and to this end would suggest that the state boards of education in Montana, Idaho, Washington, Oregon and California, be asked to incorporate a regular course of studies embracing forestry subjects in their text books.

The manifested co-operation of the operating department of the railroads in the matter of the use of fuel oil and by other means for the prevention of fires, and the active participation of the publicity departments of the various railways and also that of the telephone and telegraph companies in the matter of providing generous space in their folders for announcements looking to the prevention of fires, is heartily appreciated. The attendance of railroad officials to confer and discuss measures and means for the prevention of forest fires is extremely desirable.

We urge upon the legislative assemblies of the Northwestern states, the necessity for liberal appropriations for fire patrol work to the end that not only the valuable timber resources be conserved but that lives and homes of settlers be protected.

In this connection, we believe there should be the most perfect understanding and co-operation between the forest officials and forest owners of our National,

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State, Dominion and Provincial Governments to the end that all the timber of the Northwest be adequately and systematically protected and we particularly emphasize the need for co-operation along the international boundary.

The growing of timber is a National and State function and we most earnestly recommend that the various timbered states of the West embraced in this organization impress upon their legislatures the necessity for taking such steps as will insure the reforestation of such areas of our cut-over and denuded lands best adapted for reforestation.

The efforts being made in our public institutions of learning to assist in finding practical ways and means for the saving of our by-products from wood waste is of inestimable value to the whole lumber industry, and should be encouraged. The pulp industry opens up a steadily increasing field for research along the line of practical conservation.

This Association recommends and requests that the National Government build wagon roads across National forests to connect with State roads when the state highway department of any state certifies that such connecting road is a public necessity, and we request that Congress provide necessary funds for this work.

We desire to express our appreciation to the lumbermen of Seattle for the very delightful and hospitable entertainment provided during the sessions of the Association, and also to the management of the Hotel Washington for the many courtesies extended.

To the daily press of the City of Seattle, the press of the Northwest and to the lumber trade journals, we express our thanks and acknowledge especial appreciation for their efforts at all times to advance the interests of the Western Forestry and Conservation Association through a generous use of their columns.

To the United States Forest Service, Dominion Government of Canada and the Province of British Columbia, we desire to express our appreciation of their co-operation by the presence of such a large number of Federal, Dominion and Provincial Forestry officials and representative citizens at this conference. This closer welding of those interested in the preservation of the timber of North America, is a manifestation of the common interests the countries possess in the preservation of their timber wealth.

J. J. DONOVAN,
D. P. SIMONS,
SMITH RILEY,
C. H. RICHARDSON,
GEO. M. CORNWALL,

LEGISLATIVE COMMITTEE.

Your committee on legislation recommends:

First—That the Western Forestry and Conservation Association approves no proposed legislation not founded on the following basic principles:

The fullest possible provision for co-operation of private, state and Federal agencies for forest protection.

Home rule in working out all details of organization and methods to meet local conditions.

Freedom from political influence in forest administration.

Independence in forest work as against its subordination under general commissions handling other lines of work.

Second—That the Western Forestry and Conservation Association acquire from Federal, State and Association officials information pertaining to legislative matters of particular interest and that such information as may be of value and interest to local associations, state and Federal officials be disseminated for their use, and further:

That local associations be requested to keep the Western Forestry and Conservation Association advised at all times of the legislative situation in the several Western States.

Third—That the Western Forestry and Conservation Association go on record as favoring legislation looking to extension of State Forest work, to embrace in addition to fire protection, acquisition of land for State Forests and assistance to private owners in forest management.

Fourth—That this Association urge larger State appropriation for forest work.

Fifth—That, so far as is consistent, the Association encourages measures looking to reform in forest taxation.

C. S. CHAPMAN,
T. E. LOYNAHAN,
E. G. AMES,
COERT DUBOIS,
W. E. WELLS.

RAILROAD CO-OPERATION.

Your committee reports as follows in the matter of railroad co-operation, which is an endorsement of the report of your last year's committee, together with our additional recommendation.

1. Clearing up rights of way of railroads of all combustible material on ground; not necessary to take down trees or take out stumps unless punky, rotten or hollow.

2. Establishing efficient patrol of tracks during dry season, both night and day, under the supervision of a Chief Patrolman to be appointed by the Railrway Company for each division or district. Chief Railway Patrolman shall confer with the local fire associations and fire wardens.

3. Increase efficiency of spark arresters and transforming all engines being operated through timbered districts to oil burners as far as practicable. It must be realized that local conditions must govern in each individual case. Factors to be considered are railroad ownership of coal mines, location of coal mines on lines of railroad and consequent effect of use of oil upon local industries, also cost of oil as compared with coal, taking into consideration cost of installation of oil, transportation and empty haul of oil equipment.

4. More strict enforcements of order that steam be turned on all ashes dumped from engines. Stringent enforcement of orders that no ash pans be dumped while train is in motion during the fire season.

5. That orders be given expediting the furnishing of men from road gangs and section crews. Fire wardens and patrolmen be given right to ride on any freight train and in case of emergency train dispatchers be authorized upon request of fire wardens or patrolmen to stop any train, in order to afford needed protection.

6. Report of all fires by all train crews at first telegraph or telephone station.

7. Sharing of expense of patrol by railroads.

8. That association, Federal and State organizations furnish their regular employees within their respective territories to assist in fire patrol.

9. That authentic information of the condition of railroad rights of way, the methods used under different conditions and of all fires originating on or adjacent to the right of way, be obtained by Federal, State and private organizations in order to present definite data to effect improvements and methods. In collecting data for preparation of statistics regarding fires, wardens and foresters be required to report not only the number but the time, place and location, approximate amount of damage and by whom fire extinguished, whether railway employees or others. Report should segregate railroad fires as between logging roads, transcontinental lines and other common carriers.

10. That this situation be kept before the railroads, the organizations interested in fire protection and the general public, in order to insure a practical working out of these recommendations.

Approved.

M. J. BUCKLEY,
W. C. ALBEE,
R. D. PRETTIE,
T. J. HUMBIRD.
F. A. SILCOX.

FIELD CAMPS OF NATIONAL TROOPS.

The committee appointed by the president, at the last meeting held in Portland, in December, 1912, to continue the effort for securing the co-operation of our National military forces in the establishment of field posts in the National Forests during the Summer months, begs to report as follows:

Endorsement by National Convention W. C. T. U.

"The following resolution was unanimously passed at the National Convention of the W. C. T. U., held in Portland, October 19-26, 1912:

"Whereas, The utilization of regular troops in our National Forests has proven their value in the disastrous fires that ravaged our National Forests in 1910; and

"Whereas, There is now a bill before Congress looking to establishment of field posts during the Summer months in the Pacific Northwest States, in our National Forests, as a means of supplementing the Forest Service in emergencies; and

"Whereas, The experience gained in fire fighting has excellent moral and physical effect on the soldiers, by removing them from the routine of post life and bringing them into actual contact with civic life, under the most wholesome conditions. Therefore be it

"Resolved, That this convention heartily approves the use of troops in safeguarding our National Forests; and also believes in adequate Federal and State appropriations for the protection of our forests from the fire demon."

Similar resolution was unanimously adopted by the National Conservation Association at its last meeting held in Indianapolis, Indiana.

There is a bill before Congress on this subject:

E. F. CARTIER VAN DISSEL,
E. G. GRIGGS,
GEO. M. CORNWALL.

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COMMITTEE ON NOMINATIONS.

Mr. Chairman: Your committee on nominations beg leave to report that the Western Forestry and Conservation Association at its meeting in April, 1912, elected officers for the ensuing year. At the same meeting the date of the annual election was changed from the first Monday in April to the first Monday in December. Inasmuch as the officers elected at the meeting in April, 1912, have not yet served the full time for which they were elected, and the by-laws of the Association provide that officers elected shall serve until their successors are elected and qualified, we recommend: That the election of officers be passed at this time, thus allowing the present officers to serve their respective positions until the first Monday in December, 1913. Respectfully submitted,

F. J. DAVIES,
C. G. BRIGGS,
R. D. SWALES,
JOHN R. TOOLE,
J. H. BLOEDEL.

ROSTER OF ATTENDANCE

A

E. G. Ames, Puget Mill Co., Port Gamble, Wash.

L. R. Andrews, British Columbia Forest Branch, Victoria, B. C.

J. P. Austin, American Lumberman, Seattle, Wash.

W. C. Albee, Northern Pacific Railway, Tacoma, Wash.

W. A. Anstie, Mountain Lumber & Manufacturers' Association, Calgary, Alta.

Chas. Albertson, Grant, Smith & Co., Seattle, Wash.

Robert B. Allen, Lumber Trade Journal, Seattle, Wash.

E. T. Allen, Association Forester, Portland, Ore.

H. V. Abel, Official Stenographer, Seattle, Wash.

B

M. J. Buckley, O.-W. R. & N. Co., Portland, Ore.

J. H. Bloedel, Larson Lumber Co., Seattle, Wash.

E. H. Bucklin, The Small & Bucklin Lumber Co., Ltd., New Westminster, B. C.

Chas. G. Briggs, Holland, Briggs & Avery, Portland, Ore.

Leonard Bronson, National Lumber Manufacturers' Association, Chicago, Ill.

Carl Bush, Western Electric Co., Seattle, Wash.

R. E. Benedict, British Columbia Forest Branch, Victoria, B. C.

H. W. Benedict, U. S. Forest Service, Boise, Idaho.

Victor H. Beckman, Beckman Lumber Co., Seattle, Wash.

P. S. Bonney, University of Washington, Seattle, Wash.

Edw. P. Blake, Washington Log Brokerage Co., Seattle, Wash.

O. Bystrom, Washington Forest Fire Association, Seattle, Wash.

V. O. Baker, American Lumberman, Seattle, Wash.

B. W. Bawden, Manager James D. Lacey & Co., Seattle, Wash.

A. D. Beckwith, Vancouver, B. C.

E. C. Blanchard, General Manager, N. P., Tacoma, Wash.

Harry W. Bringhurst, Fire Marshal, Seattle, Wash.

H. K. Benson, Prof. U. of W. Seattle, Wash.

Thos. Bordeaux, Mason Co., Logging Co., Seattle, Wash

W. H. Barr, Seattle, Wash.

C

D. Roy Cameron, Canadian Dominion Government Service, Kamloops, B. C.

C. S. Chapman, Oregon Forest Fire Association, Portland, Ore.

Geo. H. Cecil, U. S. Forest Service, Portland, Ore.

Roland D. Craig, Dominion Lumber & Timber Co., Vancouver, B. C.

Roy L. Campbell, B. C. Forest Branch, Victoria, B. C.

J. I. Campbell, C. M. & P. S. R. R., Seattle, Wash.

R. W. Condon, Puget Mill Co., Port Gamble, Wash.

Geo. M. Cornwall, The Timberman, Portland, Ore.

L. G. Chapman, Old Oregon Lumber Co., Seattle, Wash.

G. W. Cain, West Coast Lumberman, Tacoma, Wash.

W. E. Crosby, Pacific Lumber Trade Journal, Seattle, Wash.

N. F. Caywood, Forest Service, Everett, Wash.

P. L. Carlson, Forest Service, Medford, Ore.

C. S. Cooper, Marconi Wireless Co., Seattle, Wash.

A. B. Cooper, Toronto, Canada.

Frank B. Cole, West Coast Lumberman, Tacoma, Wash.

T. J. Casey, P. H. Casey & Co., Seattle, Wash.

Arthur Cook, U. of W., Seattle, Wash.

Ralph Clark, U. of W., Seattle, Wash.

E. T. Clark, Prof. U. of W., Seattle, Wash.

R. E. Chinn, Chinn Bros., Seattle, Wash.

D. W. Campbell, S. P. Co., Portland, Ore.

D

T. H. Donovan, Sunset Timber Co., Raymond, Wash.

F. J. Davies, Edward Routledge Timber Co., Coeur d'Alene, Idaho.

J. J. Donovan, Lake Whatcom Logging Co., Bellingham, Wash.

Coert DuBois, U. S. Forest Service, San Francisco, Cal.

Allan H. Dougharty, Ocean Lumber Co., Seattle, Wash.

L. R. DeCamp, U. of W., Seattle, Wash.

J. D. Day, Day Lumber Co., Seattle, Wash.

E

W. I. Ewart, Seattle, Wash.

Oliver Erickson, U. of W., Seattle, Wash.

W. Vincent Evans, U. of W., Seattle, Wash.

W. E. Eschew, Seattle, Wash.

F

E. H. Finlayson, Fire Inspector, Dominion Forestry Branch, Ottawa, Ont.

A. Flavelle, Thurston-Flavelle Lumber Co., Port Moody, B. C.

A. L. Flewelling, Milwaukee Land Co., Spokane, Wash.

Thos. C. Fields, Seattle, Wash.

R. L. Fromme, Forest Supervisor, Olympia Wash.

Edwin B. Faulkner, Western Timber Co., Portland, Ore.

Newton W. Fields, Seattle, Wash.

G

J. D. Gilmour, B. C. Forest Service, Victoria, B. C.

H. H. Gibson, Editor Hardwood Record, Chicago, Ill.

Fred H. Gilman, American Lumberman, Seattle, Wash.

W. C. Gladwin, Supervisor of Fire Wardens, Vancouver, B. C.

E. S. Grammer, Browns Bay Log Co., Seattle, Wash.

Everett G. Griggs, St. Paul & Tacoma Lumber Co., Tacoma, Wash.

Wells Gilbert, Wilson River Lumber Co., Portland, Ore.

Geo. W. Gilbert, U. of W., Seattle, Wash.

C. S. Galbraith, C. P. R. R. Forestry Br., Calgary, Alberta.

H

Frank Heath, C. A. Smith Timber Co., Marshfield, Ore.

T. J. Humbird, Humbird Lumber Co., Sandpoint, Idaho.

John Hendry, Pres. Canadian Forestry Association, Vancouver, B. C.

John H. Haak, Oregon Logging & Timber Co., Portland, Ore.

E. O. Hawksett, Panhandle Lumber Co., Ltd., Spirit Lake, Idaho.

W. E. Herring, District Engineer, U. S. Forest Service, Portland, Ore.

W. D. Hulbert, Seattle, Wash.

Arthur J. Hendry, B. C. M. & T. Co., Vancouver, B. C.

W. G. Hutton, Forest Service, Portland, Ore.

A. J. Hanson, White River Lumber Co., Enumclaw, Wash.

Virgil H. Hancock, U. of W., Seattle, Wash.

Harley Hansen, U. of W., Seattle, Wash.

R. L. Herren, Crown Columbia Paper Co., Portland, Ore.

I

James A. Izette, Izette Logging Co., Brinnon, Wash.

O. D. Ingall, B. C. Forest Branch, Victoria, B. C.

J

Ham C. Johnson, Forester for Cedar River Watershed for City of Seattle, Cedar Falls, Wash.

Geo. W. Johnson, Puget Mill Co., Seattle, Wash.

G. C. Joy, Washington Forest Fire Association, Chehalis, Wash.

W. S. Jelliff, Lumber Insurers Gen. Agcy., Portland, Ore.

K

H. N. Keifer, Northern Electric & Manufacturing Co., Vancouver, B. C.

M. D. Knapp, U. of W., Seattle, Wash.

Frank Klaoucher, U. of W., Seattle, Wash.

F. C. Knapp, Peninsula Lumber Co., Portland, Ore.

L

T. E. Lovnahan, California Forest Protective Association, San Francisco, Cal.

John Lafon, Forest Branch, Victoria, B. C.

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C. A. Lyford, Clark & Lyford, Vancouver, B. C.

Otto Lachmund, Arrow Lakes Lumber Co., Arrow Head, B. C

M

Howard I. Monks, U. of W., Seattle, Wash.

M. L. Mueller, U. of W., Seattle, Wash.

J. H. Martin, Timber Inspector, Nelson, B. C.

W. N. Millar, Canadian Dominion Government Service, Calgary, Alta.

Fred Markland, B. C. Forest Branch, Victoria, B. C.

W. C. Miles, Globe Lumber Co., Globe, Wash.

Valentine H. May, Seattle, Wash.

G. H. Martin, Jr., U. of W., Spokane, Wash.

D. M. McFarland, Vancouver, B. C.

L. D. McLeod, O. & N. R. R. Co., Portland, Ore.

E. L. McPherson, Geo. L. & J. A. McPherson, Portland, Ore.

J. P. McGoldrick, McGoldrick Lumber Co., Spokane, Wash.

D. L. McKay, Mueller Lumber Co., Portland, Ore.

H. R. McMillan, B. C. Forest Service, Victoria, B. C.

J. T. McDevitt, Golden Fleece Co., Portland, Ore.

O

John O'Brien, Brooks, Scanlon, O'Brien Co., Vancouver, B. C.

P

George Palmer, The George Palmer Lumber Co., La Grande, Ore.

G. H. Plumber, Western Land Agent Northern Pacific Railway, Tacoma, Wash.

T. Frank Paterson, Paterson Timber Co., Vancouver, B. C.

W. L. Prosser, Mississippi Valley Lumberman, Seattle, Wash.

R. D. Pullen, Canadian Pacific Railway, Seattle, Wash.

R. D. Prettie, C. P. R. R. Forest Branch, Calgary, Canada.

A. L. Phillips, Western Electric Co., Seattle, Wash.

R

T. M. Reeder, Pacific Coast Coal Co., Seattle, Wash.

J. G. Robson, Timber Land Lumber Co., Ltd., New Westminister, B. C.

F. C. Riley, Bloedel Stewart & Welch, Myrtle Point, B. C.

A. W. Rees, Southern Pacific Co., Portland, Ore.

Smith Riley, U. S. Forest Service, Denver, Colo.

Douglas Rodman, C. A. Smith Timber Co., Marshfield, Ore.

W. J. Ross, Coeur d'Alene Timber Protective Association, Clarkia, Idaho.

C. H. Richardson, Western Lumber Co., Missoula, Mont.

P. S. Ridsdale, Executive Secretary American Forestry Association and Editor American Forestry, Washington, D. C.

Geo. E. Rex, A. T. & S. F. Ry., Topeka, Kan.

A. M. Riley, Portland, Ore.

S

C. H. Shattuck, Prof. of Forestry, University of Idaho, Moscow, Idaho.

F. A. Silcox, U. S. Forest Service, District 1, Missoula, Mont.

E. A. Sherman, U. S. Forest Service, District 4, Ogden, Utah.

F. W. Stevens, British-Canadian Lumber Co., Vancouver, B. C.

E. L. Staples, Otis Staples Lumber Co., Ltd., Wycliffe,, B. C.

Dwight A. Sanborn, Clark L. Poole Co., Chicago, Portland, Ore.

W. B. Scott, Great Northern R. R., Seattle, Wash.

Frank Schwabacher, Crown Columbia Paper Co., San Francisco, Cal.

E. A. Sterling, Forest & Timber Engineer, Philadelphia, Pa.

R. D. Swales, Redwood Fire & Protective Association, Fort Bragg, Cal.

E. O. Siecke, Deputy State Forester, Salem, Ore.

W. J. Spencer, The George Palmer Lumber Co., La Grande, Ore.

D. P. Simons, Manager The Sound Timber Co., Seattle, Wash.

H. G. Stimson, U. of W., Belleville, Kans.

B. A. Strawbridge, Seattle, Wash.

K. J. Schmaelzle, U. of W., Seattle, Wash.

Philip H. Stuart, U. of W., Seattle, Wash.

T

Clark W. Thompson, Wind River Lumber Co., Cascade Locks, Ore.

R. M. Townsend, Portland Railway, Light & Power Co., Portland, Ore.

John A. Toole, Anaconda Copper Mining Co., Missoula, Mont.

W. H. Talbot, Pope & Talbot, San Francisco, Cal.

S. B. Tiplin, Seattle, Wash.

U

W. M. Urquhart, Chehalis, Wash.

V

Henry Van Dyke, U. of W., Seattle, Wash.

E. F. Cartier VanDissel, Pheonix Lumber Co., Spokane, Wash.

W

W. E. Wells, Somers Lumber Co., Kalispell, Mont.

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A. V. Willoughby, General Appraisal Co., Seattle, Wash.

W. J. Worthington, Worthington Bros., Quilcene, Wash.

J. L. Wells, Dunbar, Wis.

A. Whisnant, The Timberman, Portland, Ore.

A. F. Wilbur, St. Paul & Tacoma Lumber Co., Tacoma, Wash.

W. G. Weigle, Forest Supervisor, Ketchikan, Alaska.

J. B. White, Kansas City, Mo.

N. L. Wright, Seattle, Wash.

Russel Watson, U. of W., Seattle, Wash.

Hugo Wm. Winkenwerder, U. of W. College of Forestry, Seattle, Wash.

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Sec.-Treas., G. M. Cornwall - - Portland, Ore.
Forester, E. T. Allen - - - - Portland, Ore.

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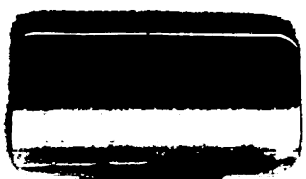

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